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ELEMENTS OF LIBRARY CLASSIFICATION



ELEMENTS

OF

LIBRARY CLASSIFICATION

Based on Lectures delivered at the University of Bombay in December 1944
and in the Schools of Librarianship in Great Britain in December 1956

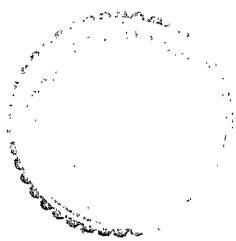
by

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TO THE MEMORY
OF MY FATHER
N. RAMAMRITAM

Editor's Note

In case it should be thought that I am claiming to have contributed anything new to this work, I should like to make it clear that all I have done is to revise the form of presentation so that it no longer appears as a series of lectures. This was done at the request of the Publications Committee of the Association of Assistant Librarians.

The *Elements* is a simple book on the theory of classification. In the course of the exposition the author has used examples from the Colon Classification, the Decimal Classification, and the Universal Decimal Classification. The book was set up in type before the publication of the sixteenth edition of the Decimal Classification, and examples in the present work refer, therefore, to the fourteenth edition. This does not affect the principles which are expounded, however, since they are applicable to all classification schemes to some degree, and are the basis of contemporary work in classification studies.

The Laws of Library Science

1. Books are for use
2. Every reader his book
3. Every book its reader
4. Save the time of the reader
5. The library is a growing organism

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CHAPTER I

What is Library Classification?

IN THIS WORK it is proposed to examine the elements of library classification. These will be reached through concrete examples and experience. A logical approach to the fundamental principles of this subject will be found in the *Prolegomena to library classification* (ed. 2, 1957). An indirect and incidental contact with them can be obtained from reading *Library Classification: fundamentals and procedure* (1943). This last is a practical handbook for those seeking systematic and graded training in the use of the Colon and Decimal classification schemes. The *Prolegomena* has been found by many to be rather abstract, indeed it presupposes a considerable experience of classification. In the courses given from year to year in the schools of librarianship of the University of Madras, Benares Hindu University and the University of Delhi, the author's practice was not to come to the systematic study of the *Prolegomena* until the last of the three terms of the course. The *Fundamentals* was intended to provide the method and material for drilling in classification throughout the year. The author's practice was to draw out in each period of drill only one or two canons of classification which had been illustrated by the exercises worked in that period. In this manner, the principles of classification were brought to notice one by one in a seemingly casual way, perhaps a long and tedious business. It was only in the last term when the *Prolegomena* was studied systematically that the principles were clinched and strung together. It was sometimes felt that the method was too slow and diffuse.

It is necessary to say a word at this juncture about the question of technical terminology in classification, as this appears to distress some of our colleagues, although anybody should be prepared to concede that it is, on the whole, better for any special discipline to set up its own special, carefully defined, terminology, rather than to use common terms. The emotional and other associations of words often unconsciously detract from accurate and exact thinking. If we settle down and learn the special terminology of a

subject as a preliminary step, we gain a great deal in clarity and economy of thought at all later stages. The classics, be they scientific or humanistic, bear witness to this.

But the use of special terminology requires persistent co-operation on the part of the student, and not infrequently a willingness to undergo special initiation into its use. In spite of this, some librarians still want to be told the principles of library classification without the use of special terminology. They sometimes even insist on something quite simple which can be followed without effort, and even without sufficient experience. No other profession in the world appears to ask for anything like this. If the library profession alone feels in this unprofessional way, this must be due to some faults in its attitude towards the "what", "why", and "how" of library classification. Whether this conjecture be true or not, let us begin by considering the "what", the "why" and the "how" as means of facing the principles of classification.

Even more than technical terminology, the notation involved in library classification is for some like a red rag to a bull. Many a misconception has arisen in regard to the role of notation. Some make a fetish of it, while others regard it as a non-essential auxiliary. Perhaps this difficulty can be overcome if the subject of classification can be set out in a non-notational manner, leaving notation to be considered later on.

What, then, is "library classification"? It is the translation of the name of the subject of a book into a preferred artificial language of ordinal numbers, and the individualisation of the several books dealing with the same specific subject by means of a further set of ordinal numbers which represent some features of the book other than their thought-content. The first of these ordinal numbers is called the Class Number of the book. The second ordinal number is called its Book Number. It is usual, in practice, to separate the book number from the class number by a space, or to write one below the other. The class number and the book number together constitute the Call Number of a book. The call number fixes the position of a book relative to the other books in a library.

The above answer to the question "What is library classification?" has introduced three technical terms: *viz.* Class Number, Book Number and Call Number. These constitute the notation in library classification. They are all ordinal numbers, and there are

no cardinal numbers corresponding to them. As already stated, we shall meet them only towards the end of this book, so we must not get worried by them at this stage.

There is, however, another technical term in the answer which needs our immediate attention, and this is "the subject of a book". We must stop and consider it. The term "subject of a book" is often used loosely, and this popular use can hinder our thought and vitiate our reasoning. To avoid this difficulty, we will introduce the phrase "Specific subject of a book". In discovering exactly what is meant by this, we will begin by giving a few concrete examples.

Consider G. D. H. Cole's *People's front*, published in 1937. What is its subject? One might say vaguely "British labour", or even more vaguely "the Labour movement". Some might consider that it belongs to "British History", or merely "History". But "History", "British History", "History of British political parties" and "History of the Labour Party in Great Britain" are all too wide of the mark. The *specific subject* of this book is "History of the Labour Party in Great Britain up to the 1930s". If you prefer the jargon of logic, the above analysis can be expressed as follows: the subject named as the specific subject has exactly the same extension and intension as the content of the book, whereas each of the other subjects mentioned has greater extension and smaller intension.

Let us take as a second example Elmer Edgar Stoll's *Shakespeare's young lovers*. Subjects which readily come to the mind such as "Literature", "English Literature", "English Drama", "Shakespeare", and even "Shakespearean criticism" are none of them sufficiently specific. They are all of greater extension and smaller intension than the contents of the book. Note in passing that the above subjects are set out in a descending sequence of extension and an ascending sequence of intension; but their sequence does not reach the exact specificity of the book. The only subject that does so is "Criticism of Shakespeare from the viewpoint of the psychology of love". The extension and intension of this subject coincide exactly with those of the content of the book. This subject is therefore the specific subject of the book.

We will take one more example: E. C. Baker's *Birds*. The title of this book does not bring out its specificity. It is not a general

book on birds; its field is more restricted. It certainly does not deal with all the problems connected with birds. It does not, for instance, deal with their anatomy, physiology, pathology, ecology or embryology: it merely covers their natural history. Nor does it deal with birds in all parts of the world: it is confined exclusively to Indian birds. The subject "Birds" is thus more extensive than the contents of the book in two ways. Its specific subject, i.e. the subject whose extension and intension exactly coincide with the contents of the book, is "The Natural History of Birds in India".

Having now grasped the meaning of the technical term "Specific Subject of a Book", we need no longer hesitate about using it. Indeed, we can understand each other better, and exchange ideas with fewer words if we include this term in our armoury of technical terminology. Let us, therefore, agree to accept this term, and to define it as follows:

The specific subject of a book is that division of knowledge whose extension and intension are equal to those of its thought-content.

The next phrase in our definition of library classification which demands attention is "Artificial language of ordinal numbers". Language has been defined as the sum total of the words and the ways of using them prevalent in one or more countries. That is the ordinary meaning. Language is also used in the transferred sense of any method of expression, not merely expression through words. We speak, for example, of "Finger language", "Cypher language", the "Language of flowers". These are all artificial languages. The symbols and formulae of chemistry form another artificial language designed to represent chemical action and relation. The symbols and formulae of mathematics form another powerful artificial language designed to mechanise the process of making valid inferences from given premises. Artificial languages are designed for specific purposes such as secrecy, brevity, mechanisation of thought processes, and so on.

An artificial language of ordinal numbers is designed for the specific purpose of mechanising arrangement. When we have to seat a large gathering of people in a predetermined sequence, we mechanise their seating by using ordinal numbers. When the Wembley exhibition was opened by King George V in 1924, there were over a hundred thousand visitors present. Each one had been assigned an ordinal number in advance; or, shall we say that the

name of each visitor had been translated into an ordinal number. As they entered the stadium, they had to announce themselves not as Smith, Brown or Ranganathan, but as 6.12.22, 6.14.7 or 6.16.40 (6.12.22 stood for seat number 22, in row number 12, of block number 6). The result was magical. The great crowd of over a hundred thousand people were shown to their seats, and settled down with no hitch whatever, indeed, with as much ease as if there had been only one visitor and one seat in the whole stadium. The same magic is still performed at Wembley every time the stadium is used for a large gathering of people.

Not only did these ordinal numbers put people into their seats, however: it also brought them out on demand. If a Dr. Joshi was wanted outside, an attendant who had never met him was able to pick him out by referring to his "dictionary of guests", and proceed unerringly to where he was sitting and then take him off to meet his friend. Some might be inclined to feel that it is inhuman for a man to surrender thus his proper name and become just a number. The name is natural, they might say, but the number is artificial. But is there anything "natural" about names, proper or common? One is reminded of the Tamil cook who was annoyed when an English guest referred to a potato by its English name. "Why 'potato'?" he asked, when you know that it is "*Urulaikizhangi*?" It is seldom that any of us are called the same name in every situation. One is addressed as "Daddy" at home, as "Mr. Librarian" in the library, and "Mr. Secretary" in the Association one serves, and so on. The term used to denote a person is functional: it varies with the function one performs in a given context. When the function is to secure Dr. Joshi's attention at a reception, his friend calls him "Dr. Joshi". When the function was for the attendant to find Dr. Joshi a seat at Wembley, or to retrieve him from that great crowd, then Dr. Joshi was called number 6.16.40, and was thus reduced to a mere number. And rightly so in that context and for that purpose, and all without any offence to the gentleman concerned. It is said that the logical French people reduce prospective bus passengers in Paris to mere ordinal numbers as they collect at bus stops. When the bus arrives, the conductor admits passengers on the basis of the serial numbers they have acquired, so that no one enters out of turn, and first come is first served.

In all such cases the desired sequence is fixed according to some suitable principle and then mechanised by means of ordinal numbers. It was Melvil Dewey who first popularised the application of this device to the arrangement of subjects, and he is rightly referred to as the father of modern library classification. Library classification means the reduction of subjects and books to ordinal numbers for specific purposes. These purposes are as follows: 1. When a reader asks for a book which is in a library, it must be located immediately, even though the library may have miles of shelves full of books. 2. When a book is returned to a library, its correct place on the shelves must be immediately determinable so that it can be replaced ready for the next user. 3. When a new book is added to a library it must find its proper place among the other books on the same subject. 4. When the first book on a new subject arrives in a library, it must find a place among the books on such other already existing subjects as are related to it, and in the degree of its relation to them.

The following technical terms introduced in this chapter require thinking over, and reading about: 1. Extension. 2. Intension. 3. Specific subject. 4. Class number. 5. Book number. 6. Call number.

CHAPTER 2

The "Why" of Library Classification

WE SHALL BE ABLE to see the wisdom of translating the names of subjects into an artificial language of ordinal numbers if we realise the purpose of library classification. What, then, is the purpose? It is to arrange books in a helpful sequence, or, rather, to mechanise the arrangement of books in a helpful sequence. It is also to help mechanise the correct replacing of books returned after use. Again, it is to help fix the most helpful place for a newly added book among those that are already in a library.

What is "helpful sequence" for books? We need not waste time by examining trivialities such as arrangement by colour, size or typography. The quality of books that determines their helpful sequence in a library is none of these physical attributes.

One common method of arranging books is by the names of their authors. This sequence is undoubtedly helpful to a reader who wants books by a particular author. But experience in libraries shows that more readers ask for books on a particular subject than for books by a particular author. It follows, therefore, that the subjects of books should determine their sequence if this is to be helpful. This is what the First Law of Library Science (*viz.* Books are for use) has to tell us. Books are for use as embodied thought, not as physical commodities, not even as the productions of particular individuals, except in the case of classics and of literature.

When a reader seeks information on a given subject, the arrangement of the library will only be helpful to him if all the books on that subject are to be found together. He will be served better still if they are found sorted out within each subject by their languages, and if those in any linguistic group stand in the sequence of their years of publication, the latest books standing at the very end of the group. This is one of the products of the application of the Second Law of Library Science (*viz.* Every reader his book).

The Second Law would lead us to take further action. Few readers are able to name exactly the specific subjects in which they

are interested: they usually think of a broader or a narrower one. Suppose that a reader asks for material on Public Finance. It is not sufficient if all the books on this subject are kept together. It is quite likely that the reader's wants are really more specialised than his request suggests, and that the real focus of his interest is a sub-division of Public Finance such as the Budget, Taxation, Land-Tax, Income-Tax, Death Duty or Public Debt. He will therefore be better helped if the books on these subjects follow closely after those on Public Finance. Thus the Second Law would require that the subjects themselves should be arranged according to their degree of relation. In other words, the shelf arrangement should display the full field of a reader's interest, unexpressed as well as expressed. When he looks along the shelves of the library, he should find there what he was only vaguely conscious of wanting: indeed, it is only then that he will be able to realise exactly what it is he wants. It is only then that he will feel a sense of satisfaction, which will, at bottom, be due to the fulfilment of an unexpressed want, and to the getting of something which he had not known how to ask for. This represents a deeper function to be performed by the arrangement of books in a library.

One might say too that books are "anxious" to find the readers appropriate to them, since their destiny, so to speak, is in the hands of readers. They want to be arranged in such a way that the probability of their getting their proper readers is at its highest. This will come about if subjects are arranged among themselves in the degree of their mutual relation. To illustrate: a book on Soil is likely to find its readers not only amongst those who come for a general book on agriculture, or for a book on manuring: the chance of its finding readers will therefore be increased if the subject Soil is placed between the subjects Agriculture (general) and Manuring. Similarly, the helpful place for the subject Ploughing is after Soil and before Manuring. In the same way, too, Planting comes best after Ploughing and Manuring.

This is what the Third Law of Library Science (*viz.* Every book its reader) has to tell us. This law joins with the Second Law in demanding that subjects should be arranged according to the degree of their mutual relation or affinity. We shall use the term *Filiatory Sequence* to denote an arrangement in the measure of affinity.

The Fourth Law of Library Science (*viz.* Save the time of the reader) also suggests the same conclusion as above. In fact, all of the first four Laws turn our thoughts to the specific subjects of books and to the need for a reasonably filiatory arrangement of them. A further need is that the books on any given subject should be arranged within that subject first by the languages in which they are written, and then by the dates at which they were published.

A little thought will show that an alphabetical arrangement of subjects by their names will not throw them into a filiatory sequence. It is quite easy to demonstrate this. Alphabetical arrangement will, for example, give the following sequence: Agriculture, Algebra, Apples, Arithmetic, Asparagus and Astronomy. Surely this is far from being filiatory or helpful. Anyone can see that the Laws of Library Science would require these subjects to be arranged in the following helpful sequence: Arithmetic, Algebra, Astronomy, Agriculture, Asparagus and Apples. Indeed, the phrase "Alphabetical Scattering" sums up the achievement of alphabetical order, and rules out alphabetisation as a means of arranging subjects in helpful sequence.

The few examples cited above show that there appears to be a certain sequence among subjects which will be more or less helpful to readers. This preferred sequence is usually one among millions of possible sequences. For example, the ten main classes of the Decimal Classification can be arranged among themselves in 3,628,800 different sequences. Therefore, it would be difficult to determine from the beginning, every time, the affinities of different subjects and to fix the sequence of their arrangement in an ever-consistent way. Not only would this take far too much time (thus violating the corollary "Save the time of the Staff" implied in the Fourth Law), but it would also be difficult for one person to be consistent with himself over a period of time, let alone the difficulty of different people trying to achieve consistency with each other. Moreover, the books that embody various subjects must be replaced in proper sequence on the shelves from time to time. It would be quite uneconomic to employ for such a task persons of such ability as to be able themselves to ascertain the subjects of the books they are handling, and to determine their filiatory sequence. Obviously, it must be possible to entrust such work to persons of

ordinary ability, and this can be done only if the arrangement can be mechanised. For this purpose the names of subjects must be translated into such ordinal numbers as will throw the subjects into the preferred helpful, or filiatory sequence.

In the course of this chapter, two concepts have been introduced. These are, Helpful Sequence and Filiatory Sequence. Henry Evelyn Bliss denotes the latter by the phrase "Collocation of subjects". Read about these concepts in Bliss's *Organisation of knowledge* and his *Organisation of knowledge in libraries*, and in the author's own *Prolegomena*.

CHAPTER 3

The Approach to Library Classification

COMMONLY the term "Classifier" has been used to denote two functions in connection with library classification. In order to distinguish between these two functions it is here proposed that the person who devises a scheme of classification shall be called a "Classificationist", and the one who constructs class numbers for subjects in accordance with a preferred scheme of classification shall be called a "Classifier". *Library Classification: fundamentals and procedure* is largely concerned with the job of the classifier: this present book deals with the work of the classificationist, and will attempt to show in a very concrete way the thought-process of this person. To do this, however, the active co-operation of the reader is needed. If he were a lecturer, the author could distribute duplicated sheets containing the lists of subjects which follow at the end of the chapter, and get the reader to work on them between lectures. As it is, he must ask the reader to do the suggested work before going on to read what the author would do. This chapter, then, does little more than provide the raw material and the method for the chapters which follow.

The suggested private work of the student is essential if he is to appreciate personally the problems that arise in constructing a classification scheme, and to prevent the reader accepting blindly what the author writes. Indeed, if the reader discusses the suggested work with others before and after reading the author's comments, he will have gone a long way towards discovering the fundamental principles which should be a guide to finding the most helpful sequence among subjects, and to determining the most appropriate ordinal numbers to represent them.

Below is given a list of 108 subjects arranged in what may be described as Unhelpful Alphabetical Sequence. These should be copied down on a sheet of paper, to avoid defacing the book in the process of working with them. The first task is to sort out the 108 subjects into groups of related subjects.

The systematic way of doing this task is as follows. Start the first

group with the first specific subject on the list, *viz.* "1 Agriculture". Now run an eye down the list, and add to this subject every subject which has an affinity with Agriculture, and as each subject is selected for addition to the group, strike it off the list. It will certainly be generally agreed that the following should be included in the group beginning with Agriculture: nos. 27, 52, 53, 63, 64, 72, 73, 89, 90, 104, 105 and 108. These can then be deleted from the original list.

Now begin the second group by selecting the first of the subjects still remaining on the list; this is, of course, "2 Analytical geometry". Proceeding as before, go through the remaining subjects, and the following list should be compiled for the second group: nos. 2, 3, 4, 5, 6, 49, 77, 86, 94, 95, 96 and 100. All these will, of course, be deleted from the original list as they are noted down. Now begin the third group with the first of the subjects still remaining, which is "7 Anatomy (human)". If the same process is repeated as before, and further groups are similarly constructed, the whole of the 108 subjects will be sorted into groups in due course. A bright young librarian might have realised by now that he could begin by making a set of cards corresponding to the set of 108 subjects, each one bearing the name and number of a subject. He could then assemble the cards into groups in the above manner, and so save himself much writing.

One more hint may not be out of place. The wise young librarian who comes across a term which is new to him always looks it up in a good dictionary or encyclopaedia, to fix in his mind its connotation. Even in the case of terms one thinks one knows, it is often a good plan to look them up, just to be on the safe side. Such effort is never wasted, as it helps not only the present exercise, but with the widening of the librarian's field of knowledge.

The next chapter presupposes that the "set work" has been done, and will not prove particularly helpful if this is not so.

A list of 108 Subjects in Unhelpful Alphabetical Sequence

1. Agriculture
2. Analytical geometry
3. Analytical geometry of cubic curves
4. Analytical geometry of cubic surfaces
5. Analytical geometry of quadric curves

6. Analytical geometry of quadric surfaces
7. Anatomy (human)
8. Anatomy of the digestive system (human)
9. Anatomy of flowering plants
10. Anatomy of the intestines (human)
11. Animal husbandry
12. Avoidance in British law of contracts
13. Avoidance in British law of partnership
14. Avoidance in Indian law of contracts
15. Avoidance in Indian law of partnership
16. Behaviourism
17. Bibliography of geography
18. Botany
19. Breeding of horses
20. British law
21. British law of contracts
22. British law of partnership
23. Chemical technology
24. Chemical technology of common salt
25. Chemical technology of salts
26. Christian law
27. Cold storage of potatoes
28. Criticism of *Hamlet*
29. Criticism of John Marston
30. Criticism of Shakespeare
31. Current electricity
32. Curriculum
33. Digestive system (human)
34. Economics
35. Education
36. Educational psychology
37. Electricity
38. Elementary education
39. English drama
40. English literature
41. Epistemology
42. Exemption from tax on income from government bonds
43. Exemption from stamp duty
44. Exemption from stamp duty in Bombay
45. Exemption from stamp duty in Bombay in the 1940s
46. Field psychology
47. Flowering plants
48. Geography
49. Geometry
50. Geopolitics
51. *Hamlet*
52. Harvesting
53. Harvesting of potatoes
54. Hindu law
55. Horse husbandry
56. Hybridisation of horses
57. Income-tax
58. Indian journal of geography (begun in 1926)
59. Indian law
60. Indian law of contracts
61. Indian law of partnership
62. Indirect taxes
63. Insect infestation of crops
64. Insect infestation of potatoes
65. International geographical conference (first conference 1850)
66. Intestines (human)
67. Jewish law
68. Journal of the Royal Geographical Society (founded in 1830)
69. Law
70. Literature
71. Logic
72. Manure
73. Manure for potatoes
74. Marston (John) (English dramatist, born 1575)
75. Mathematical curriculum
76. Mathematical curriculum for secondary schools
77. Mathematics
78. Medicine
79. Metaphysics
80. Muslim law
81. Philosophy
82. Physics
83. Physiology (human)

84. Physiology of the digestive system
85. Physiology of the intestines
86. Plane analytical geometry
87. Plant anatomy
88. Political science
89. Potato crop
90. Potato farming
91. Psycho-analysis
92. Psychology
93. Public finance
94. Pure geometry
95. Pure geometry of cubic surfaces
96. Pure geometry of quadric surfaces
97. Scottish geographical magazine (begun in 1884)
98. Secondary education
99. Shakespeare (William) (English dramatist, born 1564)
100. Solid geometry
101. Solubility of common salt
102. Specific heat of common salt
103. Stamp duty
104. Storing of agricultural produce
105. Storing of potatoes
106. Tax on income from government bonds
107. Taxation
108. Weeding

CHAPTER 4

Groups of Related Subjects

GROUPING of the 108 subjects, if carried out in the manner suggested, ought to have led to the formation of 15 groups. It will obviously be convenient if we can attach an appropriate label to each group. Equally obviously, the label of a group ought to be the name of the main class of knowledge of which the subjects included form subclasses. The appropriate label for the first group, then, should be "Agriculture", for the second "Mathematics", for the third, perhaps, "Medicine", and so on.

Let us first see what groups the author himself would arrive at, then each group can be commented upon to settle any doubts about grouping, for it is quite likely that some differences will have arisen. Just to ensure that all possibilities have not been overlooked it might be worth while for the reader, even at this juncture, to re-examine his list of groups, and make up any further groupings that suggest themselves as helpful. By comparison of groupings, and a reading of the comments that follow the list of groups given below, it should be possible to bring out some of the fundamental principles that lie at the base of our thought. Here, then, are the author's groups.

Slightly Helpful Grouping, with Unhelpful Alphabetical Sequence within each Group

GROUP 1. *Agriculture*

1. Agriculture
27. Cold storage of potatoes
52. Harvesting
53. Harvesting of potatoes
63. Insect infestation of crops
64. —do—of potatoes
72. Manure
73. —do—for potatoes
89. Potato crop
90. —do—farming
104. Storing of agricultural produce
105. Storing of potatoes
108. Weeding

GROUP 2. *Mathematics*

2. Analytical geometry
3. —do—of cubic curves
4. —do—of cubic surfaces
5. —do—of quadric curves
6. —do—of quadric surfaces
49. Geometry
77. Mathematics
86. Plane analytical geometry

GROUP 2—*contd.*

94. Pure geometry
95. Pure geometry of cubic surfaces
96. —do—of quadric surfaces
100. Solid geometry

GROUP 3. *Medicine*

7. Anatomy (human)
8. —do—of the digestive system
10. —do—of the intestines
33. Digestive system (human)
66. Intestines (human)
78. Medicine
83. Physiology (human)
84. —do—of the digestive system
85. —do—of the intestines

GROUP 4. *Botany*

9. Anatomy of flowering plants
18. Botany
47. Flowering plants
87. Plant anatomy

GROUP 5. *Animal Husbandry*

11. Animal husbandry
19. Breeding of horses
55. Horse husbandry
56. Hybridisation of horses

GROUP 6. *Law*

12. Avoidance in British law of contracts
13. —do— —do—partnership
14. —do—in Indian law of contracts
15. —do— —do—partnership
20. British law
21. —do—of contracts
22. —do—of partnership
26. Christian law
54. Hindu law
59. Indian law
60. —do—of contracts
61. —do—of partnership
67. Jewish law
69. Law
80. Muslim law

GROUP 7. *Psychology*

16. Behaviourism
36. Educational psychology
46. Field psychology
91. Psycho-analysis
92. Psychology

GROUP 8. *Geography*

17. Bibliography of geography
48. Geography
58. Indian journal of geography (begun in 1926)
65. International geographical conference (first conference 1850)
68. Journal of the Royal Geographical Society (founded in 1830)
97. Scottish geographical magazine (begun in 1884)

GROUP 9. *Chemical Technology*

23. Chemical technology
24. —do—of common salt
25. —do—of salts
101. Solubility of common salt
102. Specific heat of common salt

GROUP 10. *Literature*

28. Criticism of *Hamlet*
29. —do—John Marston
30. —do—Shakespeare
39. English drama
40. English literature
51. *Hamlet*
70. Literature
74. Marston (John) (English dramatist, born 1575)
99. Shakespeare (William) (English dramatist, born 1564)

GROUP 11. *Physics*

31. Current electricity
37. Electricity
82. Physics

GROUP 12. *Education*

32. Curriculum
35. Education
38. Elementary education
75. Mathematical curriculum
76. —do—for secondary schools
98. Secondary education

GROUP 13. *Economics*

34. Economics
42. Exemption from tax on income from government bonds
43. Exemption from stamp duty
44. —do—in Bombay
45. —do—in Bombay in the 1940s
57. Income-tax
62. Indirect taxes
93. Public finance
103. Stamp duty
106. Tax on income from government bonds
107. Taxation

GROUP 14. *Philosophy*

41. Epistemology
71. Logic
79. Metaphysics
81. Philosophy

GROUP 15. *Political Science*

50. Geopolitics
88. Political science

Let us now take each of the 15 groups in succession, and look more carefully at those subjects whose inclusion in the group is likely to be questioned by some.

GROUP 1. *Agriculture.* There appears to be no subject included in this group which raises any special difficulty. No one is likely to contend that 63 and 64 should really form a separate group with the label "Zoology" because they both involve insects. These two subjects involve both crops and insects; but obviously the main subject of study is "Crops", and the insects enter only in a subordinate way, in as much as they injure the crops. If two main classes are involved in a subject, we must decide which is the primary one and group the subject with the primary class involved.

GROUP 2. *Mathematics.* There cannot be any difference of opinion about the inclusion of any of the subjects in this group.

GROUP 3. *Medicine.* There will be no disagreement about the contents of this group if the true connotation of the term "Medicine" is kept in mind. It is not used in the popular sense of something taken to cure an illness, nor even in the sense of the science of disease prevention or cure. Here it stands for the science of the human body: its anatomy, physiology, diseases and growth, the cure of disease, surgery, pharmacognosy or the science of drugs, public health, hygiene; everything, in short, concerning the human body.

GROUP 4. *Botany*. The subjects included here are all obviously in the right group.

GROUP 5. *Animal Husbandry*. Perhaps "Breeding" and "hybridisation" might cause one to toy with the idea of putting these subjects into the main class Biology as being more appropriate. That main class, however, is by convention reserved for methodology and pure science, whereas the practical application of these subjects to animals of economic value is, again by convention, included in "Animal Husbandry".

GROUP 6. *Law*. There cannot really be any difference of opinion about the inclusion of any of the subjects noted under this group. No one would contend that the law which prevails among any particular religious community or group should be regarded as part of religion or of sociology, since these laws are not studied from the religious or the sociological point of view. The names of the religions are only introduced in order to define a homogeneous group or community having a common legal system.

GROUP 7. *Psychology*. Perhaps in this group the subject "Educational psychology" needs closer examination. We have to make quite sure what the primary subject of exposition is. Is it psychology, or education? It must certainly be psychology. In that case, what is the point of the epithet "educational"? It is used to show that in this case psychology is being expounded in a manner that will meet the special requirements of education. The term educational merely indicates the bias of the exposition of psychology in this case. It is therefore more fitting that educational psychology should be grouped with psychology than with education.

GROUP 8. *Geography*. There are no grounds for disagreement here.

GROUP 9. *Chemical Technology*. The inclusion of "Specific heat of common salt" in this group may need a word of explanation, since some might think of putting it in "Physics". After all, specific heat is a physical property of a substance. But we must bear in mind that the main class "Physics" only deals with specific heat so far as its definition, and the methods of determining it appropriate to different states and classes of matter are concerned; that is to say, with matter as such, and not differentiated matter, or particular substances or commodities.

Physics deals only with the possession of properties by all matter

and the methods of measuring them. The science which deals with the differing measures in which different commodities share a property is called "Chemical Technology".

Again, the inclusion of "Solubility of common salt" in the group labelled "Chemical Technology" instead of that for "Chemistry" needs explanation. Chemistry is a pure science, and is concerned with processes, and a general study of chemical properties. The measure in which a particular chemical property is shared by a particular commodity or article of consumption is, by convention, considered to be part of the applied science "Chemical technology". This is analogous to the treatment accorded to the subject "Specific heat".

GROUPS 10 to 14 offer no particular difficulty, and therefore require no explanations.

GROUP 15. *Political Science*: The inclusion of "Geopolitics" in this group may call for some explanation. Geopolitics is a newly developed subject which is concerned with the study of political relations and political science in so far as they are influenced by geographical conditions. Though two main classes (i.e. Political Science and Geography) are involved in the subject, the subject being expounded is primarily Political Science, Geography being only an influencing factor, that is to say of secondary importance. It is therefore proper to include "Geopolitics" in the Political Science group.

As a preparation for the next stage in this exercise, the reader is asked to re-arrange the subjects in each of the 15 groups into what he would regard as the most helpful sequence within the group. It is unlikely that every reader will arrive at the same sequence for each group, and such differences of opinion as are known to have arisen in carrying out this exercise in the past will help us to get some insight into the fundamental principles which decide what Helpful Sequence is, and which make classification so useful. W. C. Berwick Sayers was the first librarian to isolate such fundamental principles in our field of study. He called them "Canons of Classification". His exposition of them will be found in his *Manual of classification.* Further canons are derived by a deductive process in the author's own *Prolegomena.* In the succeeding chapters we shall derive some of them by an inductive process based on the 108 subjects we are working with in this exercise.

CHAPTER 5

Helpful Sequence Within Groups

THE BASIC CANON of classification is the Canon of Helpful Sequence. Various principles are used to determine the helpful sequence in which any two specific subjects should be arranged. It is hoped that these principles will emerge one by one as we proceed with the examination of what constitutes helpful sequence among the subjects included in the 15 groups into which our original 108 subjects have been assembled. At the same time it is hoped to show certain other canons of classification that emerge from a consideration of these groups. The groups will therefore be selected for consideration in a sequence that is likely to help in the emergence of these principles and canons, in a convenient sequence and at a comfortable rate.

GROUP 11. *Physics*

Consider the subjects in Group 11, Physics: the most helpful sequence appears to be (i) 82 Physics, (ii) 37 Electricity, (iii) 31 Current electricity. Some might, however, prefer the sequence (i) Current electricity, (ii) Electricity, (iii) Physics. Well, we can agree at the outset that both these sequences are filiatory, and helpful. But both are not equally helpful. One is exactly the reverse of the other. How then are we to choose between them? By tossing a coin? That is indeed the only way, unless it is possible to discover some rational principle to help us.

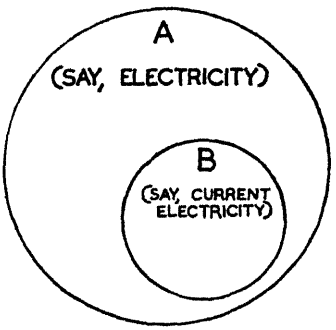
Generally, it will accord with our feeling of order if we use the first sequence. Most people would certainly agree that it is more helpful to readers if they first come across the general books on physics, then the books on successive branches of physics, such as electricity, and later the books on the successive divisions of electricity, such as current electricity. The reverse method would bring them first to books on minute divisions of physics, such as current electricity and static electricity, then to books on electricity, light and so on, and only at the end to the general books on physics. In the former, one progresses from classes of greater

extension and smaller intension to those of smaller extension and greater intension. Librarians have generally found this sequence to be more helpful. We can therefore enunciate the following:

Canon of Decreasing Extension

If one of two classes is of greater extension than the other and includes the other completely within itself, then that one must have precedence over the other.

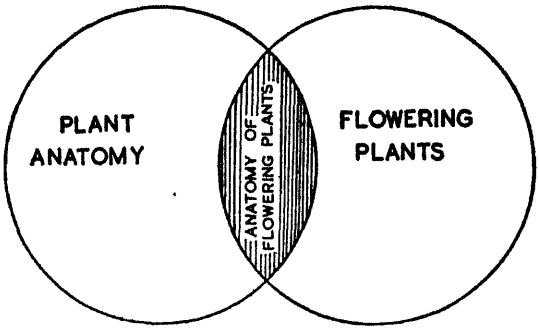
Perhaps a diagram may help in visualising the problem. If class A is represented by the bigger circle and class B by the smaller circle lying entirely within the bigger one, A must have precedence over B.



GROUP 4. *Botany*

Consider the four subjects in Group 4, Botany. By the Canon of decreasing extension, we can decide at once that "18 Botany" must come first in sequence. By the same canon, and by consideration of the affinity between them we can also decide (*a*) that "47 Flowering plants" should precede "9 Anatomy of flowering plants", and (*b*) that the two should be kept together. These two subjects can, indeed, be kept together in future under the one heading "Flowering Plants". We are now left with the problem of determining which of "87 Plant anatomy" and "47 Flowering plants" should have precedence.

If we represent these two subjects diagrammatically, we do not get a circle within a larger circle, so the Canon of decreasing extension cannot apply. The diagram we get is of a pair of



over-lapping circles. The circle representing Plant Anatomy includes not only the anatomy of different plant groups, but also the abstract principles of plant anatomy and its methodology. The circle representing Flowering Plants is solely concerned with that particular plant group, and can be said to be representing a subject which is more concrete than "Plant Anatomy". It would be better coming after "Plant Anatomy", and such a sequence is found to be more helpful. Accordingly we enunciate the following:

Principle of Increasing Concreteness

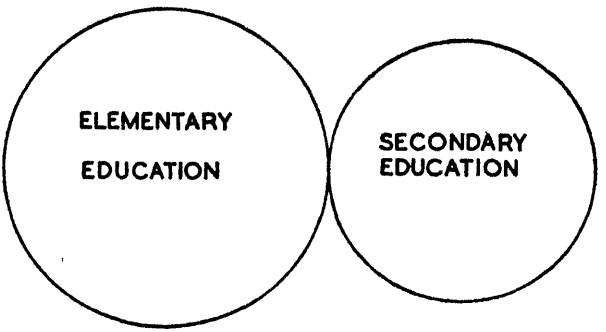
If two classes are of different degrees of concreteness, the less concrete (i.e. the more abstract) must have precedence over the other.

GROUP 12. *Education*

Next let us consider the subjects in Group 12, Education. Observing the canon of decreasing extension we should (*a*) give the first place to 35 Education, (*b*) put "75 Mathematical curriculum" after "32 Curriculum" and, so to speak, pin them together under the latter heading, (*c*) put "76 Mathematical curriculum for secondary schools" after "98 Secondary education" and pin these two together, under the latter.

In effect, therefore, we have to consider only three subjects, if we take each of the pairs pinned together as one. The three are, "32 Curriculum", "38 Elementary education" and "98 Secondary education". The principle of increasing concreteness gives precedence over the others to 32 Curriculum. This leaves us with one more problem to be solved, the determination of precedence

between 38 Elementary education, and 98 Secondary education. If we represent them diagrammatically by a pair of circles, we get neither a circle within a circle, nor two overlapping circles, but simply two non-intersecting circles.



Thus, none of the earlier principles we have discovered is of help. However, it seems reasonable to give precedence to Elementary education on the grounds that it belongs to an earlier stage of educational evolution. On this basis, the resulting helpful order for Group 12, Education is:

35 Education
32 Curriculum
75 Mathematical curriculum
38 Elementary education
98 Secondary education
76 Mathematical curriculum for secondary schools.

The principle we have used by which Elementary education has been given precedence over Secondary education is as follows:

Principle of Later in Evolution

If two classes belong to two stages in the same line of evolution, the one at the earlier stage must have precedence over the other.

GROUP 10. *Literature*

Turn now to the subjects in Group 10, Literature. Using the Canon of decreasing extension, we (*a*) put 70 Literature first, (*b*) put 74 Marston (John) before 29 Criticism of John Marston, (*c*) decide on the sequence 99 Shakespeare, 30 Criticism of Shakespeare, 51 *Hamlet*, and 28 Criticism of *Hamlet*, (*d*) put 39 English drama *before* the two subgroups based on Marston and Shakespeare,

and (*e*) place 40 English literature before 39 English drama. This still leaves us a problem to solve. Should the subgroup based on Shakespeare precede or follow that based on Marston? As Shakespeare is the older of the two, it seems reasonable to give precedence to him. Thus the helpful sequence arrived at is as follows:

70 Literature
40 English literature
39 English drama
99 Shakespeare
30 Criticism of Shakespeare
51 *Hamlet*
28 Criticism of *Hamlet*
74 Marston
29 Criticism of Marston

We have made use of a further principle in arriving at helpful sequence in this group. It is

The Principle of Later in Time

If one of two classes belongs to an earlier point of time than the other, then that one must have precedence over the other.

Geographical Area

Although our examples do not happen to contain a case where it would be used, it is convenient to introduce here a further principle: that of spatial contiguity. Consider the three countries of Europe; Austria, France and Italy. These might be arranged thus: France, Italy, Austria; or, Italy, Austria, France, or in any one of six sequences. If we are to find some principle of arrangement, other than the accidental association of alphabetical arrangement, which varies between languages, we must look for it in some permanent relationship between these countries. Clearly, the only permanent one is their position in space, so we pick on the order France, Italy, Austria. It might equally well be Austria, Italy, France, with only three countries to arrange, so the choice must finally be made arbitrarily. Nevertheless, there is to be observed working here

The Principle of Spatial Contiguity

When a number of geographical areas, not lying within one another, are to be arranged, a helpful sequence is obtainable by arranging them in accordance with their contiguity.

GROUP 14. *Philosophy*

Now, going back to our groups of subjects, let us look at Group 14, Philosophy. By the Canon of decreasing extension, the first place obviously goes to 81 Philosophy. The three remaining subjects do not appear to be susceptible to arrangement on the basis of any of the principles so far enunciated. Indeed, it is not possible to find any method of arrangement other than a traditional or conventional one. This is considered to be 71 Logic, 41 Epistemology, 79 Metaphysics. To take care of such cases, we enunciate the following principle:

The Principle of Canonical Sequence

When no other principle is available to assist in fixing a helpful sequence among a set of given classes, any traditional or conventional or canonical sequence may be adopted.

GROUP 6. *Law*

There are 16 subjects we have named as Law. By applying the Canon of decreasing extension, we get 69 Law coming first: 14, 15, 59, 60 and 61 for a subgroup of related subjects, with 59 Indian law in the leading place. Again, within that subgroup, a further sub-subgroup occurs consisting of 60 Indian law of contracts and 14 Avoidance in Indian law of contracts; these are best arranged in this sequence in accordance with the same Canon of decreasing extension. The same applies to 61 Indian law of partnership and 15 Avoidance in Indian law of partnership, which form another sub-subgroup of Law. This leaves us with the task of deciding on the precedence between these two sub-subgroups. The Canon of decreasing extension would cause us to give precedence to Contracts, since Partnership is a subdivision of Contract in law. Thus the subgroup Indian law is finally arranged as follows:

59 Indian law
60 Indian law of contracts
14 Avoidance in Indian law of contracts
61 Indian law of partnership
15 Avoidance in Indian law of partnership

Having done this once, we can do it again, and so arrive at the following order for the British subgroup of subjects:

20 British law
21 British law of contracts
12 Avoidance in British law of contracts
22 British law of partnership
13 Avoidance in British law of partnership

The next problem is to arrange the subgroups Indian law and British law among themselves. The principle of spatial contiguity leaps to mind; but India and Britain are not contiguous. We might, therefore, put them in the sequence which their respective continents might occupy in a class of continents. Only convention can really decide on a sequence between Europe and Asia. If we decide to give Asia precedence, we get the sequence Indian law, British law. Arising out of the problem of sub-arrangement in this Group, we have the following:

Canon of Consistent Sequence

When the same categories occur explicitly or implicitly in different places, they must be arranged in the same sequence in all the places.

We are still left with the problem of arranging subjects 26, 54, 67 and 80. These are the legal systems of different religious communities. If we follow the Canon of consistent sequence, we must arrange them in the same sequence as the religions themselves. The Principle of later in time would arrange the major religions of the world in the following sequence:

Hinduism
Judaism
Christianity
Mohammedanism

and to be consistent we should have the following sequence for the corresponding legal systems:

54 Hindu law
67 Jewish law
26 Christian law
80 Muslim law

In this set of subjects, the communities are arranged on the basis of religion. In the sets for 59 Indian law and 20 British law, the

communities are arranged on the basis of nationality or geographical area. Both kinds of sets fall within the Group for Law; how is the order of precedence between these two kinds to be determined? Only the Principle of canonical sequence can help here. We have to adopt some convention by which to work, and here we will adopt the convention that legal systems of national and geographic groups shall have precedence over those of religious or other groups. Now the 15 subjects in the Group for Law will fall into the following helpful sequence:

69 Law
59 Indian law
60 Indian law of contracts
14 Avoidance in Indian law of contracts
61 Indian law of partnership
15 Avoidance in Indian law of partnership
20 British law
21 British law of contracts
12 Avoidance in British law of contracts
22 British law of partnership
13 Avoidance in British law of partnership
54 Hindu law
67 Jewish law
26 Christian law
80 Muslim law

GROUP 2. *Mathematics*

In this Group, considerations of affinity will throw the twelve subjects into the following subgroups:

(*a*) 2 Analytical geometry, 49 Geometry, 94 Pure geometry.

(*b*) 3 Analytical geometry of cubic curves, 5 Analytical geometry of quadric curves, 86 Plane analytical geometry.

(*c*) 4 Analytical geometry of cubic surfaces, 6 Analytical geometry of quadric surfaces, 95 Pure geometry of cubic surfaces, 96 Pure geometry of quadric surfaces, 100 Solid geometry.

Considering subgroup (*a*), the Canon of decreasing extension will give the first place to 49 Geometry. To decide the precedence of the other two, we proceed as follows. They deal with two different methods of study, *viz.* the analytical and the purely geometrical. In this case analytical really means algebraic, and algebra and geometry are canonical divisions of the subject mathematics, falling in that very sequence. So by applying the Canon of consistent sequence, we get for subgroup (*a*) the following order: 49 Geometry, 2 Analytical geometry, 94 Pure geometry.

Application of the Canon of decreasing extension in subgroup (*b*) promotes 86 Plane analytical geometry to first place. To decide the precedence between the other two subjects, we argue that 5 deals with quadric or second degree curves, which are less complex than the cubic or third degree curves with which 3 deals: there are, for example, only six species of quadrics as against seventy-two of cubics. It therefore appears to be more helpful to put 5 before 3. The principle involved here is as follows:

The Principle of Increasing Complexity

If one of two related classes involves or deals with a lesser degree of complexity than the other, then that one must have precedence over the other.

Turning to subgroup (*c*) we find that the arguments for subgroups (*a*) and (*b*) all apply, and we get the following helpful sequence as a consequence: 100 Solid geometry, 6 Analytical geometry of quadric surfaces, 96 Pure geometry of quadric surfaces, 4 Analytical geometry of cubic surfaces, 95 Pure geometry of cubic surfaces.

The aim is that everything on quadric surfaces should be brought together, and everything on cubic surfaces should also be brought together, whether they be studied by analytical or by pure methods.

We still have to arrange these three subgroups among themselves. The Canon of decreasing extension would give first place to subgroup (*a*), while the Principle of increasing complexity would give precedence to subgroup (*b*) as it deals with planes (or two dimensional space) whereas subgroup (*c*) is concerned with solids (or three dimensional space) which are more complex. We thus get the following helpful sequence for the subjects in Group 2 Mathematics:

77 Mathematics
49 Geometry
2 Analytical geometry
94 Pure geometry
86 Plane analytical geometry
5 Analytical geometry of quadric curves
3 Analytical geometry of cubic curves

100 Solid geometry
6 Analytical geometry of quadric surfaces
96 Pure geometry of quadric surfaces
4 Analytical geometry of cubic surfaces
95 Pure geometry of cubic surfaces

We have by now brought out most of the special principles which are of use in determining helpful sequence, and will deal rapidly with the remaining eight groups of subjects.

GROUP 1. *Agriculture*

To begin with, the Principle of increasing concreteness will separate the 13 subjects contained in this group into two subgroups: those relating to agriculture in general and those relating to the potato. The Canon of decreasing extension will give precedence to the first of these. Applied in both subgroups, the Principle of later in time will produce the following helpful sequence without any difficulty:

1 Agriculture
72 Manure
63 Insect infestation of crops
108 Weeding
52 Harvesting
104 Storing of agricultural produce
90 Potato farming
73 Manure for potatoes
64 Insect infestation of potatoes
53 Harvesting of potatoes
89 Potato crop
105 Storing of potatoes
27 Cold storage of potatoes

The precedence of "Storing of potatoes" over "Cold storage of potatoes" is demanded by the Canon of decreasing extension. Some might be tempted to put 108 Weeding before 63 Insect infestation of crops. A moment's consideration would remind them that the incidence of insect infestation may occur as soon as the seeds are sown, or the seedlings transplanted; but weeds take time to grow, and weeding cannot take place till they have done so. Hence the giving of a later place to 108 Weeding.

GROUP 3. *Medicine*

The application of the Canon of decreasing extension will, in the first place, separate the 9 subjects of this group into three subgroups of three subjects each: (*a*) those relating to the whole human body, (*b*) those relating to the digestive system, and (*c*) those relating to the intestines. The same canon also serves to single out the first in each subgroup without difficulty. To fix the sequence between the other two in each case, it is necessary to invoke the aid of the Principle of later in time, and to declare that the structure of an organ is prior to its functioning. Therefore,

anatomy must take precedence over physiology in each of the three groups. This gives the following helpful order:

78 Medicine
7 Anatomy
83 Physiology
33 Digestive system
8 Anatomy of the digestive system
84 Physiology of the digestive system
66 Intestines
10 Anatomy of the intestines
85 Physiology of the intestines

Suppose, however, one arrived at the following sequence, which is quite helpful; how is one to know which of the two is better?

78 Medicine
33 Digestive system
66 Intestines
7 Anatomy
8 Anatomy of the digestive system
10 Anatomy of the intestines
83 Physiology
84 Physiology of the digestive system
85 Physiology of the intestines

None of the Principles we have so far discovered in this chapter will tell us for certain. When a situation like this arises, we have to go back behind these derived principles and appeal to the fundamental Laws of Library Science themselves. Observing these laws will cause us to examine the mode of working in the field of medicine, to find out whether specialisation is by organ or problem. The existence of dentists, ear, nose and throat specialists, heart specialists, ophthalmologists, orthopaedists and dermatologists points to specialisation by organ. If this is so, then the first sequence given will prove the more useful.

Of course, such appeals to fundamental laws are only occasionally necessary. It would be wasteful to make such appeals in every case. These fundamental laws show the way in all matters connected with running a library, such as book selection, accessioning, classification, cataloguing, shelf-arrangement, shelf-guiding, issue methods, reference service and so on. To meet the special problems connected with any of these it is convenient to derive from the Five Laws special principles shaped to solve them quickly and exactly.

It is rather like deriving from iron the special tools to suit special jobs. When a new kind of job turns up which is beyond the capacity of any existing tool, we are forced to go back to iron itself, and to improvise a temporary tool for the occasion.

When, therefore, the determination of helpful sequence among a set of subjects goes beyond the capacity of the seven special

principles derived from the Laws of Library Science for coping with problems in classification, we must go back to the laws themselves, and use their help to reach a decision. Normally, we do not turn to the Five Laws. Once they have yielded the special principles needed for the solution of different groups of problems in librarianship, they are allowed to rest in peace. They will only be disturbed when an unusual situation arises, baffling the derived principles.

An analogy can also be discovered in political organisation. The supreme governing body, the legislature, is not invoked at every turn. It creates the executive, the judiciary and the administration: it enacts a number of laws, then it rests. The normal work of the nation is done by the instruments it has created; but whenever an abnormal situation transcending their capacity arises, the legislature is disturbed from its rest, and a solution is sought directly from it.

Returning to the problem that gave rise to this disquisition, there is another reason for preferring the first alternative sequence: it satisfies the Principle of increasing concreteness.

The remaining groups of subjects are set out in helpful sequences below. As an exercise, the reader might care to justify the sequence selected in each case, with the aid of the principles arrived at so far.

GROUP 5. *Animal Husbandry*

11 Animal husbandry
19 Breeding of horses
55 Horse husbandry
56 Hybridisation of horses

GROUP 8. *Geography*

17 Bibliography of geography
48 Geography
58 Indian journal of geography (begun in 1926)
68 Journal of the Royal Geographical Society (founded in 1830)
97 Scottish geographical magazine (begun in 1884)
65 International Geographical Conference (first conference 1850)

GROUP 9. *Chemical Technology*

23 Chemical technology
25 Chemical technology of salts
24 Chemical technology of common salt
102 Specific heat of common salt
101 Solubility of common salt

GROUP 13. *Economics*

34 Economics
93 Public finance
107 Taxation
57 Income-tax
106 Tax on income from government bonds
42 Exemption from tax on income from government bonds
62 Indirect taxes
103 Stamp duty
43 Exemption from stamp duty
44 Exemption from stamp duty in Bombay
45 Exemption from stamp duty in Bombay in the 1940s

GROUP 15. *Political Science*

88 Political science
50 Geopolitics

The student should look up the Canon of helpful sequence and the Canon of consistent sequence and the associated principles in the *Prolegomena*, and locate and read corresponding information in the books of Bliss and of Sayers.

He should also work out the helpful sequence for the 15 main classes into which the 108 specific subjects have been divided. He should also find out the sequence into which they are thrown in the Colon Classification and in the Decimal Classification.

We shall next take each of the 15 groups in succession, with the subjects arranged in helpful sequence, translate the names of the subjects into their Decimal Numbers and observe whether the preferred sequence is preserved by the Decimal Numbers or whether it is changed. If it is changed we shall examine whether the change is for the better or the worse. We shall also be on the look-out for other experiences. In this process we shall contact many more fundamental ideas and Canons of classification. We shall also translate the names of the subjects into Colon Numbers, and study the result in the same way as in the case of Decimal Numbers.

Those students who are ambitious may, with the aid of the *Fundamentals*, and of the *Decimal classification* and *Colon classification* respectively, practise constructing the Decimal Numbers and the Colon Numbers.

CHAPTER 6

The Canons of Classification

WE HAVE SO FAR come into contact with only two canons of classification in arranging our list of subjects in helpful sequence: these are the Canon of helpful sequence and the Canon of consistent sequence. More will emerge as we translate the names of the subjects into class numbers, and we now propose to take the Decimal and Colon numbers for the subjects in each group in succession, and to discuss them so as to bring to light as many canons as possible.

GROUP 11. *Physics*

The following table gives the translations of the included subjects into the numbers of the two classification schemes:

DC No.	*Subject*	*CC No.*
530	Physics	C
537	Electricity	C6
537·5	Current electricity	C62

We find that both schemes preserve the sequence that we ourselves have preferred.

If we look in the schedules of the Decimal Classification for the meaning of the number 537·5, we find only the word "Dynamic". This is only an adjective, and the table above shows that 537·5 is taken to mean "Current, or Dynamic electricity". How does this come about? Well, by looking a few lines above the word Dynamic, in the schedules, we find that 537 is translated as "Electricity". From this we can infer that the subdivision ·5 Dynamic of 537 must be completed by the addition of the noun "Electricity". It is simply an economy to omit the noun in all the subdivisions of 537, and to leave it to the understanding of the reader. This practice of omitting words by the classificationist, and of leaving them to be mentally supplied by the classifier is a common one in setting out the schedules of a classification, because it is a valuable economy. It is governed by the following:

The Canon of Context

If a term entered in a schedule against a class number is by itself incomplete in meaning, or is likely to have more than one meaning, the correct and complete meaning may be obtained by referring to the term occurring in the same schedule against the class number of which the class number originally considered is a subdivision.

Turning to the Colon Classification for the meaning of C62, we find that we have to construct its meaning by combining the meanings of C6 (=electricity) and 2 (=current). Here again, in this scheme, the term current electricity is obtainable by the Canon of context.

Going back to the Decimal Classification, we find that it uses the term "Dynamic electricity" whereas the same subject is nowadays known by the name "Current electricity". In this respect, the Decimal Classification is said to violate the following:

The Canon of Currency

The terms used in the schedules of a scheme of classification should be those in actual currency among those persons who deal with the subject.

The Colon Classification has respected this canon in regard to the subject under consideration.

GROUP 14. *Philosophy*

The following table gives the Colon translations of the subjects in this group:

CC No.	*Subject*
R	Philosophy
R1	Logic
R2	Epistemology
R3	Metaphysics

The Colon Classification therefore preserves the sequence we ourselves have preferred. There is no peculiarity in the use of the terms.

The following table gives the Decimal translation, with the subjects re-arranged in the sequence in which the Decimal Classification puts them:

DC No.	*Subject*
100	Philosophy
110	Metaphysics
121	Epistemology
160	Logic

It can be stated that this arrangement violates the Canon of helpful sequence. This is not the only occasion upon which this canon is violated in the subdivisions of the class Philosophy in the Decimal Classification. It would be a good exercise to make a list of such violations.

GROUP 4. *Botany*

The following table gives the Decimal translations of the subjects:

DC No.	*Subject*
580	Botany
581·4	Plant anatomy
582	Flowering plants
	Anatomy of flowering plants

So far as the first three subjects go, the Decimal Classification preserves the sequence which we have decided is preferable. But the subject "Anatomy of flowering plants" is translated by it into the same DC number as the subject "Flowering plants". This is a fault, as the four specific subjects in the group form a chain of subjects with decreasing extension. The decimal language proves hospitable enough to provide a separate decimal number to accommodate the first three links in this chain, but cannot provide a separate number for the fourth link, which is therefore obliged to share the same number as its immediate universe, *viz.* "Flowering plants". This fault is described in technical terminology as a violation of the Canon of hospitality in chain.

The following table gives the Colon translations of the same subjects:

CC No.	*Subject*
I	Botany
I:2	Plant anatomy
I5	Flowering plants
I5:2	Anatomy of flowering plants

The Colon Classification satisfies the Canon of hospitality in chain in this case, and also preserves our preferred sequence.

The following is the definition of this canon:

The Canon of Hospitality in Chain

The notation of a scheme of classification must be such that as a class is subdivided further and further the resulting subclasses in the chain each get a distinctive class number, so that these class numbers preserve their proper filiatory sequence.

GROUP 12. *Education*

The following table gives the Decimal translation of the subjects in this group:

DC No.	*Subject*
370	Education
372	Elementary education
373	Secondary education
375	Curriculum
375·51C	Mathematical curriculum
?	Mathematical curriculum for secondary schools

In the first place, the Decimal Classification has rearranged the classes, the chief disorder being the insertion of "Elementary education" between "Education", which is general, and "Curriculum" which concerns general education. Filiatory sequence requires that nothing should separate general education from anything that concerns it. If anything separates them, the Canon of helpful sequence is violated.

Secondly, "Mathematical curriculum for secondary schools" is left in an unenviable position. It is like the proverbial ass starving to death between two equally distant haystacks because it could not choose between them. The trouble is traceable to the co-ordinate classes "373 Secondary education" and "375 Curriculum" not being mutually exclusive. A subject like "Curriculum for secondary schools" ought, by rights, to be in both of these two classes, unless it be given a distinctive place of its own. This phenomenon is described as the violation of the Canon of exclusiveness, which can be defined as follows:

The Canon of Exclusiveness

The co-ordinate classes of a universe should be mutually exclusive.

This phenomenon will cause much confusion and inconsistency in actual practice. It is therefore necessary to make a directive to put such a disturbing new class definitely and consistently into one of the two possible classes. In this case the directive would be to put it into 373 Secondary education.

This convention, it must be noted, still violates the Canon of hospitality in chain.

The following table gives the Colon translations of the same subjects:

CC No.	*Subject*
T	Education
T:44	Curriculum
T:44(B)	Mathematical curriculum
T15	Elementary education
T2	Secondary education
T2:44(B)	Mathematical curriculum for secondary schools

The Colon Classification preserves the sequence which we have already decided upon as being most helpful. It satisfies the Canon of hospitality in chain and avoids violating the Canon of exclusiveness.

The great difference between the ways in which the Decimal and the Colon Classifications translate the names of the six subjects of Group 12, Education is not mere chance. It will be seen to persist everywhere systematically. It is due to a fundamental difference in the ways in which the two schemes build up their numbers. Let us take a closer look at this difference.

Education may be divided on the basis of the stage or class of persons to be educated. Then it will yield classes such as "Elementary", "Secondary", "University", "Adult" and so on. It can also be divided on the basis of the problem considered. Then it will yield classes like "Teaching technique", "Curriculum", "Hygiene", "Organisation" and so on.

These two sets of classes are derived from "Education" which is the *universe* being classified, on the basis of two different qualities, *characteristics* of it, *viz.* Educand and Problem, respectively. Further, the first set of classes, which share the same Educand

characteristic in different measures and are therefore co-ordinate with one another, are said to form an Array of classes. Similarly, the second set of classes form another Array and are based on another characteristic, *viz.* Problem Characteristic. Each of these two arrays is homogeneous. To secure homogeneity among the classes of an array all its classes must be derived from the universe on the basis of one and the same characteristic. From this is derived the following:

The Canon of Consistency

We must consistently use one and the same characteristic to derive an array of co-ordinate classes from a universe.

The array of classes derived from Education by the Decimal Classification is (1) Teachers, methods, etc., (2) Elementary, (3) Secondary, (4) Adult, (5) Curriculum, (6) Women, (7) Religion, etc., (8) University, (9) Public schools, state and education. Of these nine classes (2), (3), (4), (6) and (8) are derived on the basis of the Educand characteristic, while the remaining four are on the basis of the Problem characteristic, with the result that the array is not homogeneous. The Canon of consistency is violated and this in turn leads to a violation of the Canon of exclusiveness, as we have already seen.

To respect the Canon of consistency, the Colon Classification derives two different arrays of classes from Education, one based on each of the characteristics Educand and Problem. Each of these two arrays is, therefore, homogeneous.

GROUP 10. *Literature*

We return now to our groups of subjects, and give below the Decimal translations for those in Group 10.

DC No.	*Subject*
800	Literature
820	English literature
822	English drama
822·33	Shakespeare
	Hamlet
	Criticism of *Hamlet*
	Criticism of Shakespeare
822·39	Marston (John)
	Criticism of Marston

To accommodate *nine* subjects, the Decimal Classification provides only *five* places. Four subjects are huddled together at the same number, 882·33. This is rather like asking four guests at a party, who happen to belong to the same family, all to sit in the same chair because of a shortage of chairs. If we remember that each of these four subjects may have dozens of different books on it, we can imagine how hopelessly all these books will get mixed up. It will be a quite unhelpful hotch-potch. In a similar way, the two subjects "Marston" and "Criticism of Marston" have to occupy one and the same number. This phenomenon we have already described as a violation of the Canon of hospitality in chain.

Another point: if we look up the meaning of 822·39 in the schedules of the Decimal Classification we find that it is not labelled "Marston", but "Minor writers". This number has to accommodate not only one dramatist, but all the dramatists of the Elizabethan age except the eight who have been given independent numbers. Crowding so many dramatists together at one number is like asking several guests, not even related to one another but of co-ordinate status, to occupy the same chair. This phenomenon is described as a violation of the following canon:

✓ The Canon of Hospitality in Array

An array of classes must contain an independent and exclusive place for every one of the classes that can be derived for it from its immediate universe.

This canon is a more delicate and exacting one than the following:

The Canon of Exhaustiveness

The classes in an array must totally exhaust the universe from which the array is derived.

By making 822·39 stand for the residual class "Minor writers", the Decimal Classification has fulfilled the Canon of exhaustiveness, though it has failed in respect of the Canon of hospitality in array.

Bliss and Sayers both recognise the Canon of hospitality in array, but they appear to make it the equivalent of the Canon of exhaustiveness. Further, they do not appear to have brought out

the fact that hospitality is a compound concept made up of the twin ideas of hospitality in chain and in array. The author himself went through a long period of uneasiness, almost amounting to agony of mind, until he had succeeded in isolating the two species of hospitality. Once the two species were separated, however, it was easy to follow up the notational implications of each.

Decimal Fraction Notation

In decimal fraction notation, every class number is taken to be a pure decimal fraction. In other words, a decimal point is taken as "understood" at the beginning of every class number.

Hospitality in chain refers to the provision of an independent class number for each class in a modulated chain of classes in progressive subordination. The genius of Melvil Dewey harnessed the decimal fraction notation to provide infinite hospitality in chain. This notational device is now widely used. It is sometimes followed even in the numbering of parts, chapters and sections in books.

Hospitality in array refers to the provision of an independent class number for each member of a homogeneous array of co-ordinate classes. The Colon Classification has devised the octave notation to provide infinite hospitality in array.

Octave Notation

This consists of numbering the classes in an array as follows: 1, 2, 3, 4, 5, 6, 7, 8, 91, 92, 93, 94, 95, 96, 97, 98, 991, 992, 993, 994, 995, 996, 997, 998, 9991, 9992, 9993, 9994, 9995, 9996, 9997, 9998, 99991, viz. ad infinitum.

By introducing the octave principle into its notation, the Decimal Classification could be made to satisfy the Canon of hospitality in array in almost all cases. A word is needed about this type of notation to allay alarm about all those nines. In actual practice, the first octave alone will meet the needs of 90 per cent of arrays, so that the notation will have no nine in it. In a further 9 per cent, there may be need to use the second octave, in which case there will be a nine in each number. It is only in about 1 per cent of cases that there is likely to be need to use the third or higher octaves. In such cases the nine may occur irritatingly too often. Here one must have the strength of mind

to face the recurrence of nines in those few cases or else one must force too many subjects to occupy a single number; that is, to violate the Canon of hospitality in array.

We must remember throughout that 1, 91, 991, 9991, *etc.* are co-ordinate numbers. Simply because the numbers of digits in them varies between one and four, they must not be taken to be a chain of numbers in progressive subordination. In fact, the digit "9" is here not significant in determining co-ordination and subordination. It has been, so to speak, emasculated, and has lost its status and become reduced to a mere stepping-stone to aid movement from one octave to another. It is hoped that no one is so sentimental as to cry out that this is too bad a fate for the digit nine, and that nine should maintain its original dignity, even at the cost of occasionally violating the Canon of hospitality in array.

Consider once more this item in the Decimal Classification: 823·9 Minor writers. The term "minor writers" is said to offend the Canon of reticence, which is as follows:

The Canon of Reticence

The terms used to denote the classes in a scheme of classification must not be critical.

How can anybody assert who is a minor and who a major writer? At any rate, a classificationist has no business to parade his own opinion about the relative values of authors in the schedules of his scheme. The offensive term "minor writers" can easily be replaced by the colourless, but perfectly descriptive one "other writers".

Again, even supposing that a particular author is so generally taken as being insignificant that there is likely to be no offence in referring to him at the moment as "minor", how can one be sure that he may not, in course of time, rise in public esteem so as to be included among the major writers? Witness the vicissitudes in the public estimate of the status of William Blake. There is an amusing story illustrating this point in regard to Shakespeare himself. In his day John Bodley, when owner of the now famous Bodleian Library of the University of Oxford, is said to have thrown out of the window copies of the first quartos of Shakespeare's plays, as not being worth the trouble of accessioning. Years later that very

library had to pay hundreds of pounds to acquire copies of them. It is unwise to have a class of such impermanence, or to use as a characteristic of classification such hazy and impermanent qualities as public esteem. Classificatory science has, therefore, provided the two following canons for the guidance of classificationists:

The Canon of Ascertainability

Each characteristic of classification should be easily ascertainable.

The Canon of Permanence

Each characteristic should endure unchanged as long as there is no change in the purpose of the classification.

Returning to the group of subjects which gave rise to the foregoing discussion, below are given the translations of the subjects in Group 10, Literature, according to the Colon Classification.

CC No.	*Subject*
O	Literature
O111	English literature
O111, 2	English drama
O111, 2J64	Shakespeare
O111, 2J64:g	Criticism of Shakespeare
O111, 2J64, 51	*Hamlet*
O111, 2J64, 51:g	Criticism of *Hamlet*
O111, 2J75	Marston (John)
O111, 2J75:g	Criticism of Marston

The Colon Classification can again be seen to preserve the sequence that we have been led to prefer. It satisfies the Canon of hospitality in chain in each case. The terms in its schedules observe the Canon of reticence. It has avoided classes and characteristics which conflict with the Canons of ascertainability and of permanence.

Chronological Device

It also satisfies the Canon of hospitality in array by means of the Chronological Device, i.e. by representing each author in this case by a number which indicates the year of his birth. For example, Shakespeare is represented by J64, which is a translation of 1564, which, in its turn, is the year of his birth. Similarly, since Marston

was born in 1575, he is represented by J75. It can easily be seen that an infinity of authors can each be given a distinctive number by the chronological device. This device provides for infinite hospitality in array in a very neat way: it is a sharp device, and it is easily applied.

Some may wonder what would happen in regard to two or more authors born in the same year. Such a contingency was anticipated and provided for. Looking up Rule 683 of the Colon Classification, we find that the chronological device is not only applicable to the classification of authors, but also to that of several other subjects, problems and entities: in this rule it is shown how the difficulty is surmounted.

GROUP 3. *Medicine*

The following table gives the Decimal translations of the subjects in this group:

DC No.	*Subject*
610	Medicine
611	Anatomy
611·3	Anatomy of the digestive system
611·34	Anatomy of the intestines
612	Physiology
612·3	Physiology of the digestive system
612·33	Physiology of the intestines
?	Digestive system
?	Intestines

This table reveals at once a blind spot in the Decimal Classification treatment of Medicine. It provides no class number for a general treatment of "The Digestive system", or of "The Intestines" or of any organ at all. We have a place for the anatomy of an organ, another for its physiology, another for its diseases, but none for a general account, that is for the anatomy, physiology, diseases and indeed all the problems related to a given organ dealt with in a single treatise. This amounts to a quite serious violation of the Canon of exhaustiveness.

So far as the remaining seven subjects which are provided with class numbers are concerned, the Decimal Classification rearranges them in a sequence different from that which we had already decided upon as being helpful. Indeed, the Decimal

Classification groups, in the first instance, by the problems and within each problem by the organs. But when looking at Group 3, Medicine, in Chapter 5 we saw that it would be more helpful to group by organs in the first instance, and then by problems within each organ class.

Now let us compare the two classes:

611·3	Anatomy of the digestive system
612·3	Physiology of the digestive system.

In both, the digestive system is represented by the digit 3. This phenomenon is known as conformity to the Canon of mnemonics.

The Canon of Mnemonics

An entity must be represented by the same digit or set of digits in whatever class it occurs.

Now let us consider the pair:

611·34	Anatomy of the intestines
612·33	Physiology of the intestines

Here "Intestines" is represented by "4" in the first and "3" in the second. This is a violation of the Canon of mnemonics.

The following table gives the Colon translation of the names of the nine subjects of Group 3, Medicine:

CC No.	*Subject*
L	Medicine
L:2	Anatomy
L:3	Physiology
L2	Digestive system
L2:2	Anatomy of the digestive system
L2:3	Physiology of the digestive system
L25	The intestines
L25:2	Anatomy of the intestines
L25:3	Physiology of the intestines

So far as this table goes, all the canons are fully satisfied by the Colon Classification.

We have now encountered virtually all of the important canons of classification. We shall, therefore, without any discussion of them, give the Decimal and the Colon translations for the remaining groups, only pointing out any cases of violation of canons.

If either scheme fails to preserve the sequence already preferred by us as a result of consideration of other cases, the corresponding table will enumerate the subjects, as heretofore, in the sequence in which the scheme itself arranges them.

GROUP 1. *Agriculture*

CC No.	*Subject*
J	Agriculture
J:2	Manure
J:438	Insect infestation of crops
J:57	Weeding
J:7	Harvesting
J:7:8	Storing of agricultural produce
J321	Potato farming
J321:2	Manure for potatoes
J321:438	Insect infestation of potatoes
J321:7	Harvesting of potatoes
J321:72	Potato crop
J321:72:8	Storing of potatoes
J321:72:84	Cold storage of potatoes

The Colon Classification preserves the helpful sequence arrived at by us earlier, and individualises every subject: it satisfies both Canons of hospitality.

DC No.	*Subject*
630	Agriculture
631·55	Harvesting
631·563	Storing agricultural produce
631·8	Manure for potatoes
	Manure
632·58	Weeding
632·7	Insect infestation of crops
	Insect infestation of potatoes
633·491	Potato farming
	Harvesting of potatoes
	Potato crop
	Storing of potatoes
	Cold storage of potatoes

Confining ourselves first of all to general agriculture, we find that in the Decimal Classification the subjects denoting various stages of production are arranged in an unnatural, and therefore

unhelpful sequence. Surely there is no point in putting "Harvesting" before "Manure", "Weeding" or "Insect infestation"? Such a violation of the Canon of helpful order is quite without any purpose.

The Canon of hospitality in chain is violated in three places, as shown by the three brackets. The indiscriminate mixing up of books on different subjects of potato-farming is sure to result in unhelpfulness to the reader.

Nor are all the specific subjects relating to potato-farming put together in number 633·491 in conformity with the Canon of consistency. "Harvesting" and later related operations are supposed to go with potatoes (*see* the instruction "these numbers treat of the material operations of harvesting. Class anything about a definite crop under its special number", given as a note under 631·55 Harvesting, in the *Decimal Classification*). But insect infestation of potatoes has to be denied a place with potatoes and put with the general books on insect infestation, as the index to the Decimal Classification definitely points to it by the following entries: "Potato disease 632·452" and "Potato beetle 632·768".

As for "Manure for potatoes", there is no indication whether it should be classed with "631·852 Manure" or "633·491 Potato".

GROUP 2. *Mathematics*

CC No.	*Subject*
B	Mathematics
B6	Geometry
B6:2	Analytical geometry
B6:6	Pure geometry
B62:2	Plane analytical geometry
B623:2	Analytical geometry of quadric curves
B623:2	Analytical geometry of cubic curves
B63	Solid geometry
B632:2	Analytical geometry of quadric surfaces
B632:6	Pure geometry of quadric surfaces
B633:2	Analytical geometry of cubic surfaces
B633:6	Pure geometry of cubic surfaces

The Colon Classification preserves the sequence preferred by us in our examination of the groups. It also individualises each subject and satisfies all the canons. Note particularly the play of

mnemonics in the numbers for the curves and surfaces of similar degrees.

DC No.	*Subject*
510	Mathematics
513	Geometry Pure geometry
513·58	Pure geometry of quadric surfaces
513·59	Pure geometry of cubic surfaces
516	Analytical geometry
516·1	Plane analytical geometry
516·22	Analytical geometry of quadric curves
516·26	Analytical geometry of cubic curves
516·42	Analytical geometry of quadric surfaces
516·46	Analytical geometry of cubic surfaces
?	Solid geometry

The Decimal Classification of Group 2, Mathematics presents many difficulties. What exactly does 513 Geometry cover? It appears to be a residual class for holding all geometries other than Descriptive geometry and Analytical geometry, which have 515 and 516 respectively for their numbers. The application of the Canon of enumeration confirms this, that is why Pure geometry is shown in the table against 513. But if a book dealing with all kinds of geometries comes along, there is no Decimal number to represent it. This is a violation of the Canon of exhaustiveness.

In 513·58 and 513·59 it is the second five that represents "solid" or "three dimensions"; but in 516·42 and 516·46, it is the four that represents this idea. This is a violation of the Canon of mnemonics. Again, in the first of the above pair of numbers, 8 represents "quadric" or "second degree", and 9 "cubic" or "third degree"; but in the second of the above pair, 2 represents "quadric" and 3 represents "cubic". This is a further violation of the same canon.

It can also be seen that the Decimal Classification has arranged the specific subjects in anything but the sequence which we ourselves have decided would be helpful.

GROUP 5. *Animal Husbandry*

CC No.	*Subject*
λ	Animal husbandry
λ442	Horse
λ442:(G:6)	Breeding
λ442:(G:64)	Hybridisation

Now consider the following table in relation to the above:

G	Biology
G:6	Genetics. Phylogeny
G:64	Hybridisation

It can be seen that the Canon of mnemonics is followed to the limit.

Subject Device

The device by which this is achieved is called the Subject Device. Looking up Rule 685 of the Colon Classification we find particulars of this very powerful device, which not only secures automatic conformity to the Canons of consistent sequence, helpful sequence, hospitality in array, hospitality in chain and mnemonics, but also leads to great economy in the length of the schedules of the classification.

The original home, so to speak, of "Breeding" and "Hybridisation" is in the schedules for "Biology", which is the science of everything concerned with living bodies. The numbers are fixed for them in the basic schedule of Biology, and are bodily transferred to represent the same ideas in whatever other subject they also occur as a part. This is a charming device which the Colon Classification did not use in its first edition. By the time the second edition appeared, however, the device had taken definite shape, and was incorporated in it.

Here are the Decimal translations of the same group of subjects.

DC No.	*Subject*
636	Animal husbandry
636·1	Horse
636·10824	Breeding
636·1082431	Hybridisation

The following are taken from the basic Biology schedules of DC.

570	Biology
575	Phylogeny. Genetics
575·282	Hybridisation

In the second of the above tables, 5 represents Genetics or Breeding; but in the first table the same subject is represented by 4. Again, in the second table, 282 represents Hybridisation, whereas 31 does so in the first. This shows how the Canon of mnemonics is

violated and how, as a consequence, the schedule has to be lengthened indefinitely by the enumeration of the basic biological subdivisions everywhere they are needed.

GROUP 6. *Law*

CC No.	*Subject*
Z	Law
Z44	Indian law
Z44, 3	Indian law of contracts
Z44, 3, 4	Avoidance in Indian law of contracts
Z44, 33	Indian law of partnership
Z44, 33, 4	Avoidance in Indian law of partnership
Z56	British law
Z56, 3	British law of contracts
Z56, 3, 4	Avoidance in British law of contracts
Z56, 33	British law of partnership
Z56, 33, 4	Avoidance in British law of partnership
Z(Q2)	Hindu law
Z(Q5)	Jewish law
Z(Q6)	Christian law
Z(Q7)	Muslim law

The Colon Classification preserves the exact sequence which we have earlier decided to be preferable. The Canon of hospitality in chain is respected and every one of the subjects is individualised. The play of mnemonics also is unmistakable. The Canon of hospitality in array is respected by the provision of a distinct number for the legal system not only of each nation, but also of each religious community. This it manages to do by employing the subject device again.

The last four subjects concern the legal systems of four religious communities. To represent them mnemonically we must turn to the schedule of religions, which we must expect to find set out under Q Religion. This reads as follows:

Q2	Hinduism (Post Vedic)
Q5	Judaism
Q6	Christianity
Q7	Mohammedanism

The subject device in this case consisted of subdividing "Z Law" by the subject numbers Q2, Q5, Q6 and Q7.

This device is used considerably in both the Colon and the Decimal Classifications, but more often in the former. To the

extent to which the device is used a scheme gains in automatic conformity to the Canons of consistent sequence, helpful sequence, hospitality in array, hospitality in chain, and mnemonics.

The Decimal Classification numbers for the same group follow.

DC No.	*Subject*
340	Law
347	British law
347·4	British law of contracts Avoidance in British law of contracts
347·7	British law of partnership Avoidance in British law of partnership
348	Christian law
349·54	Indian law
349·54074	Indian law of contracts Avoidance in Indian law of contracts
349·54077	Indian law of partnership Avoidance in Indian law of partnership
?	Hindu law
?	Jewish law
?	Muslim law

The violation of the Canon of exhaustiveness is indicated by the absence of Decimal numbers for the last three classes. This also implies a violation of the Canon of hospitality in array, which is again indicated by the four pairs of bracketed subjects each grouped at a single Decimal number. Again, the *Decimal Classification* gives as the meaning of 347·7 not "Law of Partnership" but "Commercial & Maritime law". This indicates a further violation of the Canon of hospitality in chain. Another violation of the same canon is caused by the fact that 347 represents not only British, but United States law also.

Group 7. *Psychology*

The following are the Colon translations of the subjects in this group.

CC No.	*Subject*
S	Psychology
SobT	Educational psychology
SM9	Psycho-analysis
SN1	Behaviourism
SN3	Field psychology

The Canon of hospitality in array is respected in the above table and the different systems of psychology are given distinct

class numbers and arranged in the chronological sequence in which they were first enunciated. This is secured by means of the powerful chronological device described and explained in discussing the Colon Classification translations of Group 10, Literature. The method of use is fully explained in Rule 683 and its subdivisions in the *Colon Classification*. Note that this device makes each new system of psychology bring its own class number in its pocket, so to speak.

The Decimal translations of this group of subjects follow.

DC No.	*Subject*
150	Psychology
150·1943	Behaviourism
153·8	Psycho-analysis
?	Field psychology
370·15	Educational psychology

It is possible to construct the place 150·00137 for Educational psychology within the main class for Psychology; but this is ruled out as the subject is explicitly listed at 370·15.

There is no helpful sequence provided for the different schools of psychology. They are distributed among the detailed divisions of "Classical" psychology, or the favoured system of psychology. This is a violation of the Canon of helpful sequence, in addition to the fact that there is no mechanism to fix numbers for new systems of psychology like Field psychology, so as to satisfy the Canon of hospitality in array.

Further, the absence of distinctive numbers for the systems of psychology brings the scheme into conflict with the Canon of hospitality in chain also, for the psychology of every human group and of every problem can be studied in accordance with either the favoured system or each of the other systems of psychology. For example, we can have accounts of "Anger in old age" expounded either on the favoured system's basis, or on the basis of Psychoanalysis, or of Behaviour psychology, or of Field psychology. This implies that the notation of a classification scheme must be such that all the divisions of the favoured system of psychology can also be formed under each of the other systems of psychology. There is, at present, no apparatus to enable this to be done in the Decimal Classification. But the concept of the "Amplified Main Class" developed in the Colon Classification meets the situation ideally

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and satisfies the Canons of hospitality in array and chain, and of helpful sequence, without effort.

Amplification of the main class consists of adding to the digit of a main class the chronological number of the year of the formation of the new system. An amplified main class may be subdivided exactly as the unamplified main class upon which it is built. This provision enables the classifier to individualise any subject belonging to any system. For example, SN338:524 is the number for "The field psychology of anger in old age". Thus the Canon of hospitality in chain is respected to the full.

Group 9. *Chemical Technology*

We begin, as before, with the Colon translations of the subjects in this group.

CC No.	*Subject*
F	Chemical technology
F4	Salts
F41150	Common salt
F41150:(C433)	Specific heat
F41150:(E2201)	Solubility

The Colon Classification owes its success in individualising and arranging these subjects in the preferred helpful sequence, with such facility and in conformity to the canons of classification, in no small measure to the subject device, first encountered by us in discussing the Colon translations of the subjects in Group 5, Animal Husbandry. The foregoing table shows its further application.

The same subjects classified by the Decimal Classification give us the following table:

DC No.	*Subject*
660	Chemical technology
661·4	Salts
664·4	Common salt
664·4000154134	Solubility
?	Specific heat

A reference to the *Decimal Classification* will show that whereas Salts come under Chemicals, Common salt comes under Food. The device by which the Decimal number for "Solubility of common salt" is obtained is the subject device. The connecting symbol in DC is "0001", whereas in the Colon Classification the

number obtained by the subject device is enclosed in curved brackets, and the connecting symbol is used in this particular context. Even the use of 0001 fails to produce a Decimal number for "The specific heat of common salt" as the Decimal schedule for Physics has not provided a number for the subject Specific heat. Thus the violation of the Canon of exhaustiveness in the basic subject Physics leads to the violation of the same canon in many other places.

GROUP 13. *Economics*

There follow the Colon translations of the subjects in this group.

CC No.	*Subject*
X	Economics
X7	Public finance
X72	Taxation
X724	Income tax
X7242	Tax on income from government bonds
X7242:2	Exemption from tax on income from government bonds
X729	Indirect taxes
X7292	Stamp duty
X7292:2	Exemption from stamp duty
X7292:2.231	Exemption from stamp duty in Bombay
X7292:2.231.N4	—do—in the 1940s

Here, now, are the Decimal Classification translations.

DC No.	*Subject*
330	Economics
336	Public finance
336·2	Taxation
336·24	Income tax
336·244	Tax on income from government bonds
336·244 or 336·294	Exemption
336·27	Indirect taxes
336·272	Stamp duty Exemption
336·27209547	in Bombay in 1940s

In regard to this group, the Colon Classification can clearly be seen to be coping with the situation. The Decimal Classification also copes, except for the uncertainty caused by the violation of the Canon of exclusiveness in fixing the number for "Exemption

from tax on income from government bonds", a phenomenon similar to that which we encountered in considering Group 4, Botany. We can get out of the difficulty by adopting the convention that exemptions from a specific tax should go with the tax and not with the discussion of exemption in general. It is on the basis of this convention that "Exemption from stamp duty" is made to share the number 336.272 with "Stamp duty".

In spite of our having thus resolved the conflict with the Canon of exclusiveness, the violation of the Canon of hospitality in chain still persists in these two cases. The same canon is also violated in regard to the last subject, *viz.* "Exemption from stamp duty in Bombay in the 1940s" which has had to be accommodated in 336.27209547 along with its immediate universe "Exemption from stamp duty in Bombay". But there is every indication that this subject will be given an independent number in due course, for period subdivisions of geographical divisions are already given for some countries in the Decimal Classification: each new addition makes this improvement for one or two countries, and India, too, may get its turn sooner or later.

This progressive attempt to satisfy the Canon of hospitality in chain can be realised by comparing successive editions of the Decimal Classification. To give but one example, "Stamp duty" had no independent number in the 13th edition, and had to be included within the same number as its immediate universe "Indirect taxation" at 336.27. The 14th edition has expanded this number by the addition of another digit, and so satisfied the Canon of hospitality in chain as regards the various forms of indirect taxation.

This method of building class numbers by progressively adding digits to individualise subjects of greater and greater intension leads to a phenomenon which has been called the Canon of relativity.

The Canon of Relativity

The length of a class number is generally proportional to the degree of intension of the class it represents.

The Fundamentals introduced an expressive terminology to describe this method of continuously subdividing a class and adding to the digits of its class number. It calls a class a "focus". The

result of subdivision is called "sharpening of the focus". This is dealt with at greater length in Chapter 7. As a preparation for this chapter, it would be as well to read Chapter 24 of *The Fundamentals.*

Groups 8 and 14

Discussion of groups 8 and 14 is postponed for the present, as it raises a very advanced idea in classificatory technique. By now, however, we have become familiar with a number of technical terms. It is necessary to practise using them. Even so far as we have gone it must be apparent how brief and precise our self-expression becomes when we employ them. They are now collected for ease of reference.

Specific subject, Class number, Book number, Call number, Artificial language.

Universe, Immediate universe.

Characteristic, Class, Extension, Intension, Canon of permanence, Canon of consistency.

Array, Canon of exhaustiveness, Octave notation, Chronological device, Subject device, Canon of hospitality in array, Canon of helpful sequence, Principle of increasing concreteness, Principle of later in evolution, Principle of increasing complexity, Canonical sequence, Filiatory sequence, Canon of consistent sequence.

Chain, Canon of intension, Principle of decreasing extension, Canon of hospitality in chain, Individualisation of subject, Focus, Sharpening of focus, Canon of mnemonics, Canon of relativity.

Canon of currency, Canon of context, Canon of enumeration, Canon of reticence.

CHAPTER 7

Facet Analysis: Facet and Focus

THE COLON CLASSIFICATION was responsible for the introduction of the concepts of "Facet" and "Focus". These concepts and the terms in which they are expressed have been found to be more elegant than "Train of characteristics" and "part of the class number corresponding to a single train of characteristics" which were first used for these ideas. Using the method employed in the elucidation of the canons, a new list of 48 specific subjects, divided into groups, is now given, and through the manipulation of these, the concepts of facet and focus will be brought out.

GROUP 1. *Medicine (General)*

1. Medicine

SUBGROUP 1·1. *Disease*

2. Disease
3. Treatment of disease
4. —do—by physical energy
5. —do—by radiation
6. —do—by X-rays

SUBGROUP 1·2. *Infectious Disease (General)*

7. Infectious disease
8. Treatment of infectious disease
9. —do—by physical energy
10. —do—by radiation
11. —do—by X-rays

SUBGROUP 1·3 *Tuberculosis*

12. Tuberculosis (general)
13. Treatment of tuberculosis
14. —do—by physical energy
15. —do—by radiation
16. —do—by X-rays

GROUP 2. *Respiratory System*

17. Respiratory system

SUBGROUP 2·1. *Disease of Respiratory System*

18. Disease of respiratory system
19. Treatment of disease of respiratory system
20. —do—by physical energy
21. —do—by radiation
22. —do—by X-rays

SUBGROUP 2·2. *Infectious Disease of Respiratory System*

23. Infectious disease of the respiratory system
24. Treatment of infectious diseases of the respiratory system
25. —do—by physical energy
26. —do—by radiation
27. —do—by X-rays

SUBGROUP 2·3. *Tuberculosis of the Respiratory System*

28. Tuberculosis of the respiratory system
29. Treatment of tuberculosis of the respiratory system
30. —do— —do—by physical energy
31. —do— —do—by radiation
32. —do— —do—by X-rays

GROUP 3. *Lungs*

33. Lungs

SUBGROUP 3·1. *Disease of the Lungs*

34. Disease of the lungs
35. Treatment of disease of the lungs
36. —do— —do—by physical energy
37. —do— —do—by radiation
38. —do— —do—by X-rays

SUBGROUP 3·2. *Infectious Disease of the Lungs*

39. Infectious disease of the lungs
40. Treatment of infectious disease of the lungs
41. —do— —do—by physical energy
42. —do— —do—by radiation
43. —do— —do—by X-rays

SUBGROUP 3·3. *Tuberculosis of the Lungs*

44. Tuberculosis of the lungs
45. Treatment of tuberculosis of the lungs
46. —do— —do—by physical energy
47. —do— —do—by radiation
48. —do— —do—by X-rays

An example of facet analysis

Consider first subject number 48. Its name can be thrown into the following "skeleton" form:

Medicine [Lungs]:[Tuberculosis]:[X-ray treatment].

This skeleton form really separates the terms in the name of the subject in accordance with the trains of characteristics of classification to which they each relate. "Lungs" relates to the "Organ" characteristic, "Tuberculosis" to the "Problem" characteristic, and "X-ray treatment" to the "Handling (of disease)" characteristic. The skeleton form of the name of the subject suggests the appropriateness of saying that it has three "Facets", and that these may be called respectively:

(1) Organ facet, (2) Problem facet, and (3) Handling facet.

We shall also find it convenient to use the following mode of expression in describing the parts of the subject:

(1) "Lungs" is a "Focus" in the Organ facet of subject 48;
(2) "Tuberculosis" is a "Focus" in the Problem facet of subject 48; and
(3) "X-ray treatment" is a "Focus" in the Handling facet of subject 48.

Using the same mode of expression, we can now go on to make the following statements about subject number 47.

(1) "Lungs" is a focus in the Organ facet.
(2) "Tuberculosis" is a focus in the Problem facet.
(3) "Radiation treatment" is a focus in the Handling facet.

Subject 47 may itself be thrown into the following skeleton form:

Medicine [Lungs]: [Tuberculosis]: [Radiation treatment].

By comparing the skeleton forms and the above statements about subjects 48 and 47, we may make the following further statements:

(1) Subjects 47 and 48 have each three facets.
(2) The three facets are of the same quality in both the subjects.
(3) The focus in the Organ facet is of the same degree of sharpness in each subject.
(4) The focus in the Problem facet is of the same degree of sharpness in each subject.
(5) The focus in the Handling facet is sharper in subject 48 than in subject 47.

In fact, if we go back to subject 45, and move on towards subject 48 again, we find that the foci in the Organ and Problem facets continue to be the same, but that the focus in the Handling facet goes on getting sharper and sharper.

Let us throw subject 44 into the skeleton form: we then get

Medicine [Lungs] : [Tuberculosis].

In this we find that there is no Handling facet. Now a book on Tuberculosis of the lungs may devote a chapter, or some pages explicitly to each division based on the Handling characteristic, or at least to each of several of these divisions of knowledge, if not all of them. It may deal explicitly with, say, Nursing for tuberculosis of the lungs, Etiology of tuberculosis of the lungs, Diagnosis of that disease, Preventative methods, Treatment, Surgery, Diet regulation, After care and so on, for Tuberculosis of the lungs. In such cases, the Handling facet may be said to be "multi-focal". Or it may happen that the book does not deal with each of these independently and in such a clear cut fashion; but deals with them in a diffuse way. Then we can say that the facet is "diffuse". Ordinarily we can treat both these cases alike, and regard the

corresponding facet as being vacant. In accordance with this convention, a fuller skeleton form for subject 44 would be

Medicine [Lungs] : [Tuberculosis] : [Vacant].

Now let us throw into this skeleton form subjects 34, 39 and 44. This gives us the following:

34 Medicine [Lungs] : [Disease] : [Vacant]
39 —do— [Infectious disease] : [Vacant]
44 —do— [Tuberculosis] : [Vacant]

As we go down the above sequence we get the following:

(1) The focus in the Organ facet remains of the same degree of sharpness;
(2) The focus in the Problem facet gets progressively sharper; and
(3) The Handling facet remains vacant in every case.

As a further exercise, let us throw into this skeleton form subjects 3, 19 and 35 and compare them. We get:

3 Medicine [Vacant] : [Disease] : [Treatment]
19 —do— [Respiratory system] : [Disease] : [Treatment]
35 —do— [Lungs] : [Disease] : [Treatment]

As we go down the above sequence we get the following:

(1) The Organ facet is without a focus (i.e. it is vacant) in subject 3, and it has a sharper focus in subject 35 than in subject 19;
(2) The focus in the Problem facet is the same in all three cases; and
(3) The focus in the Handling facet is also the same in every case.

Here is yet another exercise, involving subjects 1, 17 and 33. This time we get:

1 Medicine [Vacant] : [Vacant] : [Vacant]
17 —do— [Respiratory system] : [Vacant] : [Vacant]
33 —do— [Lungs] : [Vacant] : [Vacant]

We observe here that:

(1) All the facets are vacant in subject 1;
(2) The Problem and Handling facets are vacant in subjects 17 and 33; and
(3) The focus in the Organ facet is sharper in subject 33 than in subject 17.

It is important for the student to familiarise himself with the ideas of Facet and Focus. This can be done by making a comparative study of as many different groups as possible, selected from the 48 subjects with which this chapter started. This process of setting out subjects in their skeleton form is called "Facet Analysis".

The 48 subjects are all set out below in their "skeleton form", and are also provided with their Colon and Decimal class numbers in parallel columns. The table thus shows at a glance the extent to which each scheme responds to the demands of facet analysis by the provision of numbers reflecting the analysis.

Subject	*Colon No.*	*Subject analysed into facets*	*Decimal No.*
1.	L	Medicine [Vacant]:[Vacant]:[Vacant]	610
2.	L:4	Medicine [Vacant]:[Disease]:[Vacant]	616
3.	L:4:6	Medicine [Vacant]:[Disease]:[Treatment]	
4.	L:4:62	Medicine [Vacant]:[Disease]:[Treatment by physical energy]	615·83
5.	L:4:625	Medicine [Vacant]:[Disease]:[Radiation treatment]	615·831
6.	L:4:6253	Medicine [Vacant]: [Disease]: [X-ray treatment]	615·84
7.	L:42	Medicine [Vacant]:[Infectious disease]:[Vacant]	
8.	L:42:6	Medicine [Vacant]:[Infectious disease]:[Treatment]	
9.	L:42:62	Medicine [Vacant]:[Infectious disease]:[Treatment by physical energy]	616·91
10.	L:42:625	Medicine [Vacant]:[Infectious disease]:[Radiation treatment]	
11.	L:42:6253	Medicine [Vacant]:[Infectious disease]:[X-ray treatment]	
12.	L:421	Medicine [Vacant]:[Tuberculosis]:[Vacant]	
13.	L:421:6	Medicine [Vacant]:[Tuberculosis]:[Treatment]	
14.	L:421:62	Medicine [Vacant]:[Tuberculosis]:[Treatment by physical energy]	616·995
15.	L:421:625	Medicine [Vacant]:[Tuberculosis]:[Radiation treatment]	
16.	L:421:6253	Medicine [Vacant]:[Tuberculosis]:[X-ray treatment]	

17.	L4	Medicine [Respiratory system]: [Vacant]: [Vacant]	?
18.	L4:4	Medicine [Respiratory system]: [Disease]: [Vacant]	616·2
19.	L4:4:6	Medicine [Respiratory system]: [Disease]: [Treatment]	
20.	L4:4:62	Medicine [Respiratory system): [Disease]: [Treatment by physical energy]	
21.	L4:4:625	Medicine [Respiratory system]: [Disease]: [Radiation treatment]	
22.	L4:4:6253	Medicine [Respiratory system]: [Disease]: [X-ray treatment]	
23.	L4:42	Medicine [Respiratory system]: [Infectious disease]: [Vacant]	616·2
24.	L4:42:6	Medicine [Respiratory system]: [Infectious disease]: [Treatment]	
25.	L4:42:62	Medicine [Respiratory system]: [Infectious disease]: [Treatment by physical energy]	
26.	L4:42:625	Medicine [Respiratory system]: [Infectious disease]: [Radiation treatment]	
27.	L4:42:6253	Medicine [Respiratory system]: [Infectious disease]: [X-ray treatment]	
28.	L4:421	Medicine [Respiratory system]: [Tuberculosis]: [Vacant]	616·2
29.	L4:421:6	Medicine [Respiratory system]: [Tuberculosis]: [Treatment]	
30.	L4:421:62	Medicine [Respiratory system]: [Tuberculosis]: [Treatment by physical energy]	
31.	L4:421:625	Medicine [Respiratory system]: [Tuberculosis]: [Radiation treatment]	
32.	L4:421:6253	Medicine [Respiratory system]: [Tuberculosis]: [X-ray treatment]	
33.	L45	Medicine [Lungs]: [Vacant]: [Vacant]	?
34.	L45:4	Medicine [Lungs]: [Disease]: [Vacant]	616·24
35.	L45:4:6	Medicine [Lungs]: [Disease]: [Treatment]	
36.	L45:4:62	Medicine [Lungs]: [Disease]: [Treatment by physical energy]	
37.	L45:4:625	Medicine [Lungs]: [Disease]: [Radiation treatment]	
38.	L45:4:6253	Medicine [Lungs]: [Disease]: [X-ray treatment]	
39.	L45:42	Medicine [Lungs]: [Infectious disease]: [Vacant]	
40.	L45:42:6	Medicine [Lungs]: [Infectious disease]: [Treatment]	

41.	L45:42:62	Medicine [Lungs]:[Infectious disease]: [Treatment by physical energy]	616·24
42.	L45:42:625	Medicine [Lungs]:[Infectious disease]: [Radiation treatment]	
43.	L45:42:6253	Medicine [Lungs]:[Infectious disease]: [X-ray treatment]	
44.	L45:421	Medicine [Lungs]:[Tuberculosis]: [Vacant]	616·246
45.	L45:421:6	Medicine [Lungs]:[Tuberculosis]: [Treatment]	
46.	L45:421:62	Medicine [Lungs]:[Tuberculosis]: [Treatment by physical energy]	
47.	L45:421:625	Medicine [Lungs]:[Tuberculosis]: [Radiation treatment]	
48.	L45:421:6253	Medicine [Lungs]:[Tuberculosis]: [X-ray treatment]	

Colon Classification

Some obvious comments can be made about the handling of these 48 subjects by the Colon Classification.

(1) It preserves the helpful sequence we had arrived at in dealing with the first series of subjects.
(2) It satisfies the Canon of hospitality in chain in all cases: i.e. it individualises each of the 48 subjects by providing a distinctive number for each of them.
(3) It satisfies completely the Canon of mnemonics: i.e. the same idea is represented by the same number wherever it occurs.
(4) The Canon of relativity is observed throughout.
(5) The Colon numbers reflect the facets very markedly, the symbol ":" indicating a change of facet; or, to put it another way, acting as the "Connecting symbol" between two adjacent facets.
(6) The formation of distinct facets in the Colon number gives freedom for the sharpening of the focus in any facet at need, without in any way affecting the focus in any other facet: there is also freedom to keep any facet vacant without in any way being affected by what happens to any of the other facets.

Decimal Classification

Comment on the handling of these 48 subjects by the Decimal Classification may be made as follows:

(1) There is no Decimal number which can represent the subject of a book dealing with the Respiratory system or with the Lungs or, indeed, with any other specific organ in a general or comprehensive way. To use our technical terminology, a subject in Medicine which is "Unifocal" in the Organ facet but "Multifocal" in the Problem facet cannot be accurately translated into a Decimal number. There are two such cases, noted in the table above by putting a question mark in the column for DC numbers.

(2) Only 10 of the remaining 46 subjects have close-fitting Decimal numbers. This leaves 36 subjects which cannot be distinguished from the classes of which they are subclasses. This shows how much the Decimal Classification violates the Canon of hospitality in chain.

(3) As for the 10 properly translated subjects, the Decimal numbers throw them into a different sequence from the preferred helpful sequence. In particular, while general accounts of certain modes of treatment like Radiation treatment and X-ray treatment of disease, without reference to the organ affected, come earlier than diseases of particular organs, general accounts of diseases like Infectious diseases and Tuberculosis, without reference to the organ affected, come later than diseases of particular organs. This violates the Canons of helpful sequence and consistent sequence.

(4) No special provision for the observance of the Canon of mnemonics appears to have been made. Note, for example, that the final digit 6 represents Tuberculosis in the Decimal number 616·246 for subject 44, whereas the digit 5 represents the same idea in the Decimal number 616·995 for subject 12.

(5) The absence of a special connecting symbol between facets prevents the sharpening of the focus of any but the last facet. This causes violation of the Canon of hospitality in chain in many cases.

This last point is a very serious one, and deserves more detailed consideration. We will therefore begin by constructing the facet analysis of the Decimal number 616·2 for subject 18. This gives us:

61 = Medicine
6 = Diseases [Problem facet]
2 = Respiratory system [Organ facet]

The incidence of the Organ facet after the Problem facet makes it impossible to sharpen the focus in the latter by the addition of extra digits. We are, therefore, forced to use the same Decimal number (616·2) for three successive links in the same chain:

Diseases of the respiratory system.
Infectious diseases of the respiratory system.
Tuberculosis of the respiratory system.

But the Organ facet does admit of its focus being sharpened by the addition of extra digits. For example, we get the Decimal number 616·24 for subject 34. Here facet analysis gives:

61 = Medicine
6 = Diseases [Problem facet]
24 = Lungs [Organ facet]

Now consider Decimal number 616·246 for subject 44. On analysing it we get:

61 = Medicine
6 = Diseases [Problem facet]
24 = Lungs [Organ facet]
6 = Tuberculosis [Problem facet]

When hard pressed to sharpen the focus in the Problem facet, the Decimal Classification is driven to the necessity of attaching a further Problem facet after the Organ facet. This is a remedy of despair. As a result the facet formula becomes:

Medicine [Problem] : [Organ] : [Problem]

This is not a very happy solution, for if we are forced by the appearance of a new class of books to sharpen the focus of the Organ facet, either we must admit inability to do so as a result of the development of that facet having been blocked by the re-appearance of the Problem facet after it, or we can add further to

the confusion by making the Organ facet appear once more after the second appearance of the Problem facet, which gives us the following:

Medicine [Problem] : [Organ] : [Problem] : [Organ]

This alternation might go on indefinitely. The world of knowledge is sufficiently varied and turbulent to bring about such a *reductio ad absurdum.*

And all this trouble is traceable to there being no connecting symbol between adjacent facets in the Decimal Classification. To put it another way, there is no means of indicating a change of the train of characteristic in Decimal numbers. The chief contribution of the Colon Classification to library science is the implementation of the results of facet analysis by providing just such connecting symbols.

A suggestion to the editors of the Decimal Classification

B. I. Palmer has gone into the question of adapting Decimal notation to the findings of facet analysis. He did this in a paper entitled *Does Colon point a way*? presented to the sixth All-India Conference of librarians held at Jaipur in April 1944. The paper has been published by the Indian Library Association in the *Proceedings* of that conference. At present the decimal point in the Decimal Classification notation is virtually functionless and has no ordinal value. Why not give it a value between 0 and 1, and so make it function? Or, to use Palmer's words, "use the point as a separating device, to indicate a change of characteristic in the subdivision". Palmer goes still further, and adds: "The most drastic step is to abolish the existing schedules as they stand. Doubtless this strikes fear into the heart of every hearer. Abolish the schedules and you abolish Dewey, they will say. Yet what is the purpose of DC? Is it to maintain an out-of-date conception, or is it to reduce to some sort of order the welter of books and ideas that pour in upon us from day to day? There is no point in retaining the physical form of DC unless we retain its spirit." He then refers to what has already been done in the Colon Classification and says: "The point there has become a colon; but we cannot therefore decide that a revised DC would only be half as good."

Facets intrinsic in subjects

In concluding, it must be emphasised that facets are not qualities of class numbers alone; nor are they peculiar to the scheme of classification used. On the contrary, facets inhere in the subjects themselves: that is, they exist in the subjects themselves, whether we sense them or not. Subjects will be helpfully featured, and their arrangement will be made filiatory and helpful within any scheme of classification if such a scheme is based upon facet analysis, and if the class numbers reflect the facets properly. Particularly will this be so if the method of building class numbers admits of each facet being kept intact, and of its focus being sharpened to any desired degree, as is the case in the Colon Classification. It should not allow the dismemberment and scattering of a facet, nor the alternation of facets in order to arrive at the required sharpness of focus in each facet, as happens in the Decimal Classification.

CHAPTER 8

Facet Analysis: Fundamental Categories

WE MUST NOW take a fuller view of the useful concept of Facet Analysis. This view is best reached through a series of postulates. The basic postulate is concerned with the concept of Fundamental Categories. Here it is:

Postulate 1

Each facet of any subject can be deemed to be a manifestation of one and only one of the Five Fundamental Categories—Personality, Matter, Energy, Space and Time. We may call a facet a general manifestation, and a focus in it a particular manifestation, of the fundamental category concerned.

For example, let us take subject 18 of those given in Chapter 7—Diseases of the respiratory system. We have said that "Respiratory System" is a focus in the "Organ" facet of Medicine. The Organ facet of Medicine is a general manifestation of the Fundamental Category "Personality". The focus "Respiratory System", which subject 18 has in that facet, is a particular manifestation of the same Fundamental Category "Personality". So also, we have said that "Disease" is a focus in the "Problem" facet of Medicine. The Problem facet of Medicine is a general manifestation of the Fundamental Category "Energy". The focus "Disease", which subject 18 has in that facet, is a particular manifestation of the Fundamental Category "Energy".

The connotation of the terms Personality, Matter, Energy, Space and Time will gradually clear itself in the context of the examples given in this chapter, and of the various subjects encountered in exercises in classifying. Perhaps the category Time gives the least difficulty, being self-evident. The category Space usually manifests itself as a Geographical Area; and it should not be difficult to spot this facet in any subject presenting it. The category Energy requires a little more circumspection. Generally speaking, it can be recognised if we remember that it connotes

action of one kind or another; we also consider that it comprehends structure (morphology), function (physiology), malfunction or disease, environmental action or ecology, phylogeny, ontogeny, and some other similar ideas. Generally speaking, the category Matter manifests itself as Material or any equivalent of it; this category should not be difficult to recognise in any subject; moreover, the Matter facet does not occur in many of the subjects embodied in general books. The category Personality is, however, a rather difficult concept. It is often only recognisable by elimination. After separating out the manifestations of Time, Space, Energy and Matter in a subject, the residue will often turn out to be Personality. For the residual facet must be a manifestation of one of the five fundamental categories, and by assumption the manifestations of all the other four fundamental categories have been separated out before reaching the residue. This may be called the Method of Residues. Experience will lead to the establishment of a reflex action in recognising the fundamental category of which any particular facet of a subject is a manifestation, even as experience leads to the establishment of a reflex action in recognising faces.

For brevity, we shall use the contractions and symbols mentioned below:

[P] =Personality Facet.
[M]=Matter Facet.
[E] =Energy Facet.
[S] =Space Facet.
[T] =Time Facet.

(MC)=Main Class.
(CC) =Canonical Class.
(BC) =Basic Class= (MC) or (CC).

Examples from Agriculture

We shall now consider a few subjects in Agriculture, presenting different kinds of facets. The subjects are set out with the words in their respective names analysed into facets. After each word or word-group forming a facet, the appropriate facet-symbols are added within square brackets. So also the other contractions will be found enclosed in curved brackets.

Analysis into Facets

1. Agriculture (BC).
2. Agriculture (BC) in India [S] brought up to 1950s [T].

3. Manuring [E] in agriculture (BC).
4. Manuring [E] in agriculture (BC) in India [S] brought up to the 1950s [T].
5. Agriculture (BC) of food crops [P].
6. Agriculture (BC) of food crops [P] in India [S] brought up to the 1950s [T].
7. Manuring [E] for food crops [P] in agriculture (BC).
8. Manuring [E] for food crops [P] in agriculture (BC) in India [S] brought up to the 1950s [T].
9. Agriculture (BC) of cereals [P].
10. Agriculture (BC) of cereals [P] in India [S] brought up to the 1950s [T].
11. Manuring [E] for cereals [P] in agriculture (BC).
12. Manuring [E] for cereals [P] in agriculture (BC) in India [S] brought up to the 1950s [T].
13. Agriculture (BC) of rice [P].
14. Agriculture (BC) of rice [P] in India [S] brought up to the 1950s [T].
15. Manuring [E] for rice [P] in agriculture (BC).
16. Manuring [E] for rice [P] in agriculture (BC) in India [S] brought up to the 1950s [T].
17. Manuring [E] for rice [P] in agriculture (BC) in Uttar Pradesh [S] brought up to the 1950s [T].
18. Manuring [E] for rice [P] in agriculture (BC) in Benares District [S] brought up to the 1950s [T].

Now come two more postulates.

Postulate 2

The five fundamental categories fall into the following sequence, when arranged according to their decreasing concreteness: P, M, E, S, T.

Postulate 3

The facets of a subject should be arranged in the sequence of the decreasing concreteness of the fundamental categories of which they are respectively taken to be manifestations.

Let us now restate the names of the 18 subjects in agriculture:

(1) with the facets arranged in accordance with the above-mentioned postulates; and

(2) with each word-group replaced by the focal term in it, omitting all the auxiliary words such as prepositions, conjunctions and articles. Here is the result of such a transformation of the names of the subjects, presented in tabular form.

Transformation

Ser. No.	(BC)	[P]	[M]	[E]	[S]	[T]
1.	**Agriculture**	nil	nil	nil	nil	nil
2.	**—do—**	nil	nil	nil	**India**	1950s
3.	**—do—**	nil	nil	**Manuring**	nil	nil
4.	**—do—**	nil	nil	**Manuring**	**India**	1950s
5.	**—do—**	**Food Crops**	nil	nil	nil	nil
6.	**—do—**	**Food Crops**	nil	nil	**India**	1950s
7.	**—do—**	**Food Crops**	nil	**Manuring**	nil	nil
8.	**—do—**	**Food Crops**	nil	**Manuring**	**India**	1950s
9.	**—do—**	**Cereals**	nil	nil	nil	nil
10.	**—do—**	**Cereals**	nil	nil	**India**	1950s
11.	**—do—**	**Cereals**	nil	**Manuring**	nil	nil
12.	**—do—**	**Cereals**	nil	**Manuring**	**India**	1950s
13.	**—do—**	**Rice**	nil	nil	nil	nil
14.	**—do—**	**Rice**	nil	nil	**India**	1950s
15.	**—do—**	**Rice**	nil	**Manuring**	nil	nil
16.	**—do—**	**Rice**	nil	**Manuring**	**India**	1950s
17.	**—do—**	**Rice**	nil	**Manuring**	**Uttar Pradesh**	1950s
18.	**—do—**	**Rice**	nil	**Manuring**	**Benares**	1950s

(Uttar Pradesh is the new name for the state which appears as "North West Provinces, Oudh", in the schedules of the Decimal Classification.)

Translation into Numbers

We may next translate the focal terms in the above table into their respective Colon numbers and Decimal numbers. As Decimal Classification has no provision for the accommodation of [S] and [T] in any subject whatever, we shall use the Universal Decimal Classification, which provides for the attachment of these and other facets to the Decimal number. The translation is given in a tabular form.

Ser. No.	*Colon Number* (BC)	[P]	[M]	[E]	[S]	[T]	*Universal Decimal Number* (BC)	[P]	[M]	[E]	[S]	[T]
1.	J	—	—	—	—	—	63	—	—	—	—	—
2.	J	—	—	44	N5		63	—	—	54	195	
3.	J	—	2	—	—		63	—	18	—	—	
4.	J	—	2	44	N5		63	—	18	54	195	
5.	J	3	—	—	—		63	3/5	—	—	—	
6.	J	3	—	44	N5		63	3/5	—	54	195	
7.	J	3	2	—	—		63	3/5	18	—	—	
8.	J	3	2	44	N5		63	3/5	18	54	195	
9.	J	38	—	—	—		63	31	—	—	—	
10.	J	38	—	44	N5		63	31	—	54	195	
11.	J	38	2	—	—		63	31	18	—	—	
12.	J	38	2	44	N5		63	31	18	54	195	
13.	J	381	—	—	—		63	318	—	—	—	
14.	J	381	—	44	N5		63	318	—	54	195	
15.	J	381	2	—	—		63	318	18	—	—	
16.	J	381	2	44	N5		63	318	18	54	195	
17.	J	381	2	4452	N5		63	318	18	542	195	
18.	J	381	2	445213	N5		63	318	18	54213	195	

Postulate 4

In Colon Classification, the connecting symbols to be inserted in front of the various kinds of facets are as given in the following table. The table gives also the corresponding connecting symbols in the Universal Decimal Classification.

Facet	*Connecting Symbol in*	
	Colon Classification	*Universal Decimal Classification*
[P]	,	-
[M]	;	-
[E]	:	-
[S]	.	(...) (enclosure within curved brackets)
[T]	.	"..." (enclosure within inverted commas)

Postulate 5

In Colon Classification, the connecting symbol need not be inserted before [P], *if it immediately follows* (BC).

In Universal Decimal Classification, there is not a clear distinction between [P], [M] and [E]. In the case of some (BC), these facets are provided for under the name Analytical Divisions; and the connecting symbol for them is a hyphen as given in the above table. Where analytical divisions are not provided, combination of facets is secured by the device of a colon linking numbers, as shown in the succeeding table.

In the light of the above postulates, we may synthesise the focal numbers given in the above table into the Colon Numbers and the Universal Decimal Numbers given in the succeeding table.

Synthesis

Ser. No. of Subject	*Colon Number*	*Universal Decimal Number*
1.	J	63
2.	J.44.N5	63(54) "195"
3.	J:2	631·8
4.	J:2.44.N5	631·8(54) "195"
5.	J3	633/5
6.	J3:44.N5	633/5(54) "195"
7.	J3:2	633/5-18
8.	J3:2.44.N5	633/5-18(54) "195"
9.	J38	633·1
10.	J38.44.N5	633·1(54) "195"
11.	J38:2	633·1-18
12.	J38:2.44.N5	633·1-18(54) "195"
13.	J381	633·18
14.	J381.44.N5	633·18(54) "195"
15.	J381:2	633·18-18
16.	J381:2.44.N5	633·18-18(54) "195"
17.	J381:2.4452.N5	633·18-18(542) "195"
18.	J381:2.445213.N5	633·18-18(54213) "195"

There is a convention in the Universal Decimal Classification that, whenever the number of digits within a facet exceeds 3, a dot should be inserted after each group of 3 digits. The dot has no substantive significance nor ordinal value.

It should be observed that the class numbers given in the above table preserve the sequence of the 18 subjects decided upon in the course of the analysis already made in the idea plane.

It would be an interesting exercise to compare the Colon

numbers and the Universal Decimal numbers given in the above table, in regard to their length, structure, expressiveness, etc. For example, the average number of digits in the Colon numbers is 7; and the average number of digits in the Universal Decimal numbers is 9.

The Isolate

Discussions of problems in classification will be facilitated if we can introduce a new term—Isolate—to denote the focus in a facet. If we are concerned only with the idea plane, we may speak of the focus in a facet as an Isolate Idea. Similarly, if we are concerned only with the notational plane, we may speak of the focus as an Isolate Number. So also we may speak of Isolate Term when we are concerned only with the verbal plane. A (BC) differs from an Isolate in one important respect: A (BC) can be a subject by itself, but an Isolate cannot be a subject by itself; an Isolate must combine itself with a (BC) to yield a subject.

Three Planes of Work

The division of work between the three planes—the Idea, the Verbal and the Notational is very useful. The work of Analysis with which we began is entirely in the Idea Plane; and there need not be any thought of notation at the stage of analysis. The work of transformation of the name of a subject by a re-arrangement of the word-groups in it, and by the replacement of each word-group by its focal or isolate term, preferably in terms of standard terminology, belongs largely to the verbal plane. The transformation is done in accordance with the postulates prescribed by the scheme of classification used. The Translation of the Isolate Terms into Isolate Numbers, and of the Basic Term into the Basic Number lies jointly in the verbal and the notational planes. The final Synthesis of the Basic and the Isolate Numbers into the Class Number belongs solely to the notational plane. This synthesis is done in accordance with the postulates prescribed by the scheme of classification used.

Example from Medicine

Subject 48 given in Chapter 7 is "X-ray treatment of tuberculosis of the lungs". We shall decrease its extension by the addition of a

[S] and a [T]. Let us take the resulting subject to be "X-ray treatment of tuberculosis of the lungs in India brought up to the 1950s". We shall now pursue systematically the process of classifying the above subject, demonstrating the work to be done in each of the three planes—idea, verbal and notational.

Preliminary Steps in the Verbal Plane: Filling up Ellipsis

The (BC) is not stated explicitly in the above name of the subject. But though implicit only, the (BC) is obviously Medicine. This happens quite often. The first step in the Idea Plane is to supply the name of the (BC), in the appropriate place among the words in the name of the subject. So also any other word implied in the expressed words in the name of the subject must be made explicit in the first step. We may call this step "Filling up Ellipsis in the Name of the Subject".

Breaking Up Derived Composite Terms

The word "Tuberculosis" is a Derived Composite Term. It hides in itself the manifestation of Energy and Personality. This term should be broken up and expressed in terms of its Fundamental Constituent Terms. In fact it must be replaced by the expressive term "Disease caused by tubercular bacillus".

Full Expression of the Name of the Subject

As a result of the above two steps, the name of the subject becomes "X-ray treatment of the disease of lungs caused by tubercular bacillus, in Medicine, in India brought up to the 1950s". We shall call this the Fully Expressed Name of the Subject.

Analysis into Facets in the Idea Plane

A systematic procedure in the analysis of a subject into its facets is to identify in its Fully Expressed Name the word-groups which are manifestations of the successive fundamental categories. We have already stated that the fundamental category Personality is the most elusive one, and that it is helpful to catch it as the residual facet, after all the other facets have been separated out. We have also seen that, arranged according to the ease of recognition, the

remaining four fundamental categories fall into the sequence: Time, Space, Energy and Matter. It is wise to begin with the easiest. As each such category is recognised and separated out, the remaining defiant ones will be smaller in number and this should make the task comparatively easier.

Time and Space Manifestations

The two following results are obvious:
Focus in [T] i.e. Time Isolate="Brought up to 1950s".
Focus in [S] i.e. Space Isolate="India".

Energy Manifestation

Let us remove these two word-groups mentally and concentrate on the remaining ones. We must now pick out the manifestation(s) of Energy. We find there are two of them.

Focus in [E] i.e. Energy Isolate =(1) "Treatment"; and
(2) "Disease".

Matter Manifestation

Examining the remaining word-groups for any manifestation of Matter, we find none.

Personality Manifestation

The word-groups still left are (1) X-ray, (2) Lungs, (3) Tubercular bacillus and (4) Medicine. Of these, Medicine is the (BC). We have thus only three word-groups still defying assessment. We are satisfied that none of them is a manifestation of Time or Space, or Energy, or Matter. Therefore by Postulate 1, they must be taken to be manifestations of Personality.

Facet Analysis

As a result of the above steps, we are now able to give the result of the Facet Analysis by writing out the full name of the subject as follows:

"X-ray [P] treatment [E] of the disease [E] of lungs [P] caused by tubercular bacillus. [P], in Medicine (BC), in India [S] brought up to 1950s [T]."

Transformation in the Verbal Plane

This subject presents a new phenomenon, not found in the agricultural subjects considered earlier. [P] as well as [E] occurs more than once. In arranging them, we should be guided by our common method of thinking of them. With regard to [T] and [S], however, we shall be guided by the following postulate:

Postulate 6

Ordinarily, [S] *and* [T] *should be put last.*

Arrangement of Facets

We shall now go through the thought processes of arranging the various [E] and [P] in a more or less helpful sequence. We know that "Treatment" cannot arise unless there is "Disease". Therefore, we can agree to arrange the two [E] in the sequence (1) Disease and (2) Treatment. We next seek to place the three [P] in relation to these two [E]. We can say that "X-ray" will not be thought of unless we think of "Treatment". Therefore, we can agree that the [P] "X-ray" should succeed the [E] "Treatment". We may then say that "Tubercular bacillus" is not likely to be thought of unless we think first of "Disease". Thus the [P] "Tubercular bacillus" should succeed the [E] "Disease". Again, "Treatment" cannot begin until the cause of the disease is determined. This makes us say that the [P] "Tubercular bacillus" should precede the [E] "Treatment". This fixes the position of the [P] "Tubercular bacillus" just between the two [E] "Disease" and "Treatment". This leaves us with only "Lungs" to be placed. We know that the disease in question is affecting the lungs. We therefore feel that the [P] "Lungs" should come before the [E] "Disease". Thus the resulting transformation in the verbal plane is:

(BC)	[P]	[E]	[P]	[E]	[P]	[S]	[T]
Medicine	Lungs	Disease	Tubercular bacillus	Treatment	X-ray	India	1950s

Rounds among Facets

In the above table of Facet Analysis, we find that [E] occurs more than once. We also find that each [E] gives rise to a new [P]

succeeding it. Since we have postulated that the normal sequence is [P], [M] and [E], we presume that [M] too can come more than once and that if it does, it may occur after the successive [E], even as [P] does. The subject we have used as the sample does not present any [M], however, and it can only be said here that the conjecture we have made is found to be true in subjects having [M]. At any rate, we make the following postulates, which are found to be helpful:

Postulate 7

Energy may manifest itself in one and the same subject more than once.

We now introduce some new terms and the symbols to represent them. The Second, Third, etc. Manifestations of Energy in one and the same subject will be respectively called Second Round Energy Facet, Third Round Energy Facet, etc. These will be represented by the respective symbols [2E], [3E], etc. Analogously, the first manifestation of energy may be called First Round Energy Facet and be represented by [1E], if we so desire.

Postulate 8

It is possible for a manifestation of Personality and Matter to occur after [1E], *again after* [2E], *again after* [3E], *and so on.*

These manifestations will be called respectively, Second Round Personality Facet, Second Round Matter Facet, Third Round Matter Facet, etc. These will be represented by the respective symbols [2P], [2M], [3P], [3M], etc. Analogously, the first manifestations of Personality and Matter may be said to belong to the First Round, and may be represented by [1P] and [1M] respectively, if we so desire.

Restatement of the Transformation

In the light of these postulates and the associated symbols, we may rewrite the transformation of the subject under consideration in the following form:

(BC)	[1P]	[1E]	[2P]	[2E]	[3P]	[S]	[T]
Medicine	Lungs	Disease	Tubercular bacillus	Treatment	X-ray	India	1950s

Translation from the Verbal to the Notational Plane

The result of translating the (BC) and the Isolate Terms into the (BC) and Isolate Numbers is as follows, if we use the Colon Classification:

(BC)	[1P]	[1E]	[2P]	[2E]	[3P]	[S]	[T]
L	45	4	21	6	253	44	N5

Synthesis in the Notational Plane

To do the synthesis in the notational plane, we shall use the following additional postulate:

Postulate 9

In Colon Classification, the connecting symbol need not be inserted before [2P], [3P], *etc., if these follow immediately after* [E], [2E], *etc.*

In the light of the postulates, we get the following Colon Number for the subject under consideration: L45:421-6253.44.N5.

The Universal Decimal Number is 616·24-002·5:615·849, where

61 =Medicine (MC)
6 =Disease [E]
24 =Lungs [P]
002·5=Tubercular bacillus [2P]
61 =Medicine (MC)
5 =Therapeutics [E2]
849 =X-ray [P3]

Note the scattering of the facets and the use of colon which converts a facet into a phase.

Example from Literature

Let us next apply the procedure mentioned above in classifying the subject numbered as 28 in Chapter 3, assigned to Group 10 in Chapter 4, and classified in Chapter 6. Its name is given a. "Criticism of *Hamlet*". This name is extremely elliptical. In the first instance, we have to supply the word "Literature" as the name of the (BC). We have next to recall that "*Hamlet*" implies that it is a work of Shakespeare, the English dramatist. If we fill

up the ellipsis fully, the Full Name of the Subject becomes "Criticism of the *Hamlet* of Shakespeare, the English dramatist, in the literature of the English Language, in literature".

Analysis in the Idea Plane

Obviously there is no [T] or [S] or [M]. "Criticism" is [E]. The Isolate Idea denoted by the respective residual word-groups has to be taken as a manifestation of Personality. This is indicated by the method of residues. Thus, the facet analysis of the Full Name of the Subject gives the result:

"Criticism [E] of the *Hamlet* [P] of Shakespeare [P] the dramatist [P] in the literature (BC) of the English language [P], in literature (BC)."

Here we have one [E] and four [P]. This is a new type of phenomenon, not found either in the agricultural or the medical subjects considered so far.

Transformation in the Verbal Plane

Our thinking in arranging the five facets will run along the following lines:

"Criticism" presupposes the work criticised. Therefore, we agree that the [E] "Criticism" should come only after the [P] "*Hamlet*". Similarly, "*Hamlet*" presupposes "Shakespeare"; "Shakespeare" presupposes "Drama"; and "Drama" presupposes "English Language". Thus the transformation in the verbal plane will give the result shown in the following table:

(BC)	(P)	[P]	[P]	[P]	[E]
Literature	English	Drama	Shakespeare	*Hamlet*	Criticism

Levels among Facets

In the above table, [P] occurs four times in the first round itself. Subjects such as this give rise to the following postulate:

Postulate 10

Personality may manifest itself in one and the same round in a subject, more than once.

So also in the case of Matter.

We now introduce some new terms and the symbols to represent them. The Second, Third, etc. Manifestations of Personality in one and the same round of a subject shall be respectively called the Second Level Personality Facet, the Third Level Personality Facet, etc. These will be represented respectively by [P2], [P3], etc. So also with manifestations of Matter, of a similar nature.

A little consideration will show that the second and later levels of [P] in the second round should be represented by [2P2], [2P3], etc. Analogously, the first level of [P] in the second round may be represented by [2P1], if so desired.

Analogously, the levels of [P] in the first round may be represented by [1P1], [1P2], [1P3], etc., if so desired.

So also with manifestations of Matter, of a similar nature.

Restatement of the Transformation

As a result of these postulates and the associated symbols, the statement of facet analysis will take the following form:

(BC)	[1P1]	[1P2]	[1P3]	[1P4]	[1E]
Literature	English	Drama	Shakespeare	*Hamlet*	Criticism

Synthesis

As a result of the translation of the (BC) and Isolate Terms into the respective (BC) and Isolate Numbers and of their synthesis, we get the following Colon Number for the subject:

O111,2J64,51 :g

The omission of the connecting symbol (which in this case is a comma) between the Isolate Numbers 2 and J64 is due to the following postulate:

Postulate 11

Of two consecutive facets, if all the isolate numbers in the earlier facet are known to consist of the same number of digits, the connecting symbol between the two facets may be omitted.

Easily Recognised Levels

In the case of a concrete entity, organs of the first remove constitute the Isolates in the second level; organs of the second remove

constitute the isolates of the third level, etc. For a bicycle for example, the isolates of the first level are, proceeding from bottom upwards, tyre, wheel, drive mechanism, frame, handle, seat, etc. Some of the isolates of the second level are rim, spokes and hub. A similar objective way of recognising levels has not yet been discovered for non-concrete entities.

The Limit to Levels of Personality

An examination of the levels of [P] in a bicycle will show how the limit of the levels of [P] is reached and where the change over to [M] comes in. A modulated sequence of levels is given by Bicycle, Wheel, Spoke. If we go further down this sequence, we come ultimately to steel. But steel is not an organ of a spoke. Therefore, it is not a level of [P]. It is only a constituent of a spoke; it is the material of which the spoke is made. It is therefore [M]. In the context of the Bicycle, "Spoke" is a Personality and "Steel" is Matter. The shape, the thickness, the rigidity, the colour, etc. of the spoke impress a distinctive character on the material "Steel" and thereby endow it with a Personality recognisable as a "Spoke". Steel *qua* steel does not have this Personality; it forms merely the basic Matter out of which the Personality of the Spoke is shaped.

Personality and its Ineffability

We have by now seen enough to say that Personality is an ineffable or undefinable fundamental category. That is why we have to locate it by the method of residues—that is locate it as the residue which is left over after the removal of all the [T], [S], [E] and [M] from the fully expressed name of the subject. This really amounts to a negative way of picking out the [P]. Such a negative way is known to be the only way open to recognise or point out any ineffable entity. In the Vedic tradition, God is defined only in such a negative way. "Not this, not this" is the translation of the Sanscrit name given to this method of definition and recognition.

Personality and an Illusion

There is another complication met with in recognising the [P] in the name of a subject. This is caused by a practice in the verbal plane. A word, which is apparently the name of an isolate belonging

to some other fundamental category, is often used to denote an isolate belonging to [P]. This illusion generated in the verbal plane has to be dissolved in the idea plane. This will be illustrated in the succeeding sections.

Personality vs. Matter

We have seen that "Steel" is only [M] in the context of the Bicycle. On the other hand, in the context of Metallurgy, "Steel" is [P]. In Metallurgy, it is the distinguishing characters of the different substances and materials that we concentrate upon. Rubber also is therefore only [M] in the context of Bicycle Tyre; but it is [P] in the context of Technology of Rubber. Again in the context of the Wall of a Building, a Brick is [M]; but in the context of Brick-laying it is [P].

Personality vs. Space

Consider the subject "Functions of the Second Chamber in India brought up to the 1950s". Here "the 1950s" is easily picked out as [T]. So also "Functions" is easily recognised as [E]. Nor is it difficult to regard "Second Chamber" as [P]. But what about "India"? Viewed purely from the verbal plane, it looks like [S], as it is the name of a geographical area. But there is an illusion in the verbal plane; and it must be dissolved. It is done as follows. "India" is really used to represent the "Indian Community"—a case of the name of the container being used to represent the contained. Expressed in this true form, it becomes obvious that "Indian Community" is [P]. We further see that "Second Chamber" is an organ of the "Indian Community" and is thus [P2]. According to Colon Classification, the (BC) of this subject is "History". Then the facet analysis of the full name of the subject, as transformed, will be as follows:

History (BC) Indian Community [P] Second Chamber [P2] Functions [E] 1950s [T].

The synthesised Class Number of the subject will be V44,32:3.N5. The number for the Personality Isolate "Indian Community" is obtained by the Geographical Device.

The schedules of the Decimal Classification and of the Universal Decimal Classification imply that the (BC) of the subject is

taken by them to be "Political Science". Then "India" becomes merely [S]. According to the Universal Decimal Classification, the facet analysis of the full name of the subject as transformed, will be as follows:

Political Science (BC) Second Chamber [P] Functions [E] India [S] 1950s [T].

The synthesised Class Number of the subject will be 328·31: 328·2(54)"195".

It is worth reflecting on the difference between the two schemes of classification, in the classification of this subject—particularly in regard to the (BC) to which the subject is assigned. Whatever be your opinion in the matter, as a classifier you have to carry out the intention of the classificationist as he has expressed it through the schedules furnished by him.

New Concepts and Terminology

In this chapter, we have introduced many new concepts and terms. Considerable practice is necessary to handle these concepts and use these terms with the familiarity felt for words like food, clothes, etc. These concepts base the work of the classificationist as well as that of the classifier on foundations that reach the primordial rock, as it were. This postulational approach to classification helps to see the discipline objectively and provides a safeguard against loose or hazy thinking. It makes each subject bring its own facet formula in its pocket, so to speak. One must have constant drill in the recognition of the fundamental categories, and of rounds and levels of facets in the formation of the full name of a subject and of its transformation according to the postulates, the separation of the work in the idea, verbal and the notational planes, the translation of the (BC) and the Isolate terms into numbers, and in synthesising the (BC) and the Isolate Numbers into the Class Numbers. Then classification will become an interesting piece of work. The Colon Classification gives a facet formula for most of the (BC) in part 2, and names those facets in colourful significant terms in part 1, just to help beginners to get familiar with the procedure of classifying set out in this chapter. After some experience, students outgrow the need for such props. They become able to analyse the name of any subject into its facets

straight away, and to arrange those facets in proper sequence with the aid of the postulates and the concept of fundamental categories. The postulates also provide a tool for comparing the efficiency of different schemes of classification. Most of the work in the idea plane is intrinsic to the universe of knowledge. The results of the work in the idea plane should be binding on any scheme of classification.

Analytico-Synthetic Classification

It may be further stated that a scheme of classification which admits of facet analysis, provides rules for the arrangement of facets, provides schedules for the different kinds of facets needed in diverse subjects, provides connecting symbols, and admits of the synthesis of the (BC) and the Isolate Numbers of a subject into its Class Number, is called an Analytico-synthetic Scheme of Classification. The Colon Classification and the Universal Decimal Classification are analytico-synthetic schemes. The former is more thoroughly so than the latter.

Enumerative Classification

On the other hand, an Enumerative Scheme does not rest on facet analysis. It does not, in general, give a multiplicity of schedules for (BC) and different kinds of isolates. Generally speaking, it gives only a single schedule which enumerates full-fledged classes with their ready-made class numbers. It would be a good pastime to reflect on the relative advantages and disadvantages of the two kinds of classification schemes. In this reflection, the Canons of Classification and the more fundamental Laws of Library Science should be used as guides.

CHAPTER 9

The Common Isolate

CONSIDER THE SUBJECTS of "Group 8, Geography". Subject 48 is the (MC) Geography itself. A treatise or textbook in the normal form of exposition will go into this class. The other five subjects in the group also have Geography as their subject-matter; but they are different from subject 48 in an important respect. They do not imply a normal continuous exposition of Geography. Subject 17 is "Bibliography of Geography". Items 58, 68 and 97 are names of periodicals in Geography. Item 65 is "Proceedings of a Geographical Conference". These are not really subjects. However, it is usual to make them classes in most schemes of classification. In all these cases the (BC) is "Geography". The isolates in the facets are respectively "Bibliography", "Periodical" and "Conference Proceedings". These are not divisions of knowledge. It is only by convention that they are called Isolates. Cyclopaedia, Biography, History, Collected Works and Catechism are other isolates of this kind. Isolates of this kind have two properties in common:

Ubiquity

Each of them can be attached to any class whatever, or at any rate to a great many classes, belonging to several (BC). For example, we can have a bibliography of any subject—e.g. Oceanography, the Ocean floor, the Ocean floor of the Indian Ocean, the Ocean floor of the Bay of Bengal, the Ocean floor of the Gulf of Mannar; Literature, English Literature, English Drama, Shakespeare, *Hamlet*, Criticism of *Hamlet*, Croce's Criticism of *Hamlet*; Economics, Public Finance, Income Tax, Double Taxation on Income, Double Taxation on Income in India, Double Taxation on Income in India in the Twentieth Century; and so on. The same is true of the other isolates of this kind mentioned in the preceding paragraph. These isolates are truly ubiquitous. They are therefore called Common Isolates. "Common Subdivisions", and "Form Divisions", are terms which have been

used in the past to denote them. We are now using "Common Isolate" as the standard term to denote this kind of ubiquitous isolate. We shall give a more rigorous definition of this term at a later stage.

Anteriorising Common Isolate

Secondly, the books belonging to a class to which such a Common Isolate is attached are not, generally speaking, read through at a stretch. They are more or less (some like Bibliography more, and some like History, less) looked up for some specific information, or as a help before entering into the region of the general books in the class to which they are attached. From this point of view, they are called Approach Materials on the host class. Accordingly, it would be a help if a book admitting of any such Common Isolate were placed Anterior to the regular books in the host class. In view of this, this kind of Common Isolate goes by the name of "Anteriorising Common Isolate". This is in the Idea Plane. It is the duty of the Notational Plane to implement this. To do so, the Colon Classification denotes anteriorising common isolates by lower case letters, and postulates that any class number followed by a lower case letter attached to it directly without a connecting symbol intervening, shall have precedence over the host class number. In other words, each lower case letter is invested with "Anteriorising Value".

At present, the number of an Anteriorising Common Isolate begins with "o" in Decimal Classification and with "(o" in the Universal Decimal Classification. The attachment of any such isolate number to a host class number does not lead to an anterior value. Thus, the notation of either of these schemes of classification is unable to implement the finding of the Idea Plane in this respect. However, as the Rapporteur of the FID/CA—the Committee of the International Federation for Documentation for the General Theory of Classification—the author has suggested that the "(o" be invested with anteriorising value.

Even if this suggestion is accepted, the result will lack the elegance we get in the Colon Classification. For, after this symbol "(o", it will be necessary to insert some digits to represent the Common Isolate concerned and then close the brackets. Whereas,

the Colon Classification bypasses the need for a connecting symbol. The following examples will bring out the difference in elegance.

Class	*Universal Decimal Number*	*Colon Number*
Cyclopaedia of mathematics	51(03)	B*k*
Collected works in mathematics	51(08)	B*x*
Mathematics	51	B

Posteriorising Common Isolate

Next consider the following table giving the class numbers of subjects 28, 29 and 30 of "Group 10, Literature" and a few additional ones:

Colon Number	*Subject*
B*x*M88:*g*	Criticism of the works of Ramanujan
O:*g*	Literary criticism
O111:*g*	Criticism of English literature
O111, 2:*g*	Criticism of English drama
O111, 2J56:*g*	Criticism of Shakespeare
O111, 2J56, 51:*g*	Criticism of *Hamlet*
O111, 2J75:*g*	Criticism of Marston
V56:19. N56:*g*	Criticism of the foreign policy of Great Britain in 1956
X724.56.N57:*g*	Criticism of the income tax in India in 1957

Obviously, "Criticism" is as ubiquitous as any Anteriorising common isolate we have considered. Therefore, "Criticism" also is a Common Isolate. But it is a Posteriorising Common Isolate. The connecting symbol ":" preceding the digit *g* shows this. The Notational Plane makes it posteriorising, as the Idea Plane requires it. For, as we have already seen, while studying the subjects in "Group 10, Literature" in Chapter 5, the criticism of a class is later-in-evolution than the class itself. Therefore, the criticism should succeed the class criticised. The use of ":" as the connecting symbol implies that "Criticism" is an Energy Isolate. It is so as viewed from the Idea Plane; for it is an action—intellectual action. It is, therefore, a Posteriorising Common Energy Isolate. There are also other such isolates. We can also conceive

of Posteriorising Common Personality Isolates and Posteriorising Common Matter Isolates. These are still in the stage of investigation.

Definition of Common Isolate

The following is a working definition of "Common Isolate":

An Isolate Idea, which is denoted by the same Isolate Term in the Verbal Plane and is represented by the same Isolate Number in the Notational Plane, whatever be the host class to which it is attached, and which admits of being attached to several classes belonging to several (BC), is a Common Isolate.

Time and Space Isolates

It may be verified that Time and Space Isolates satisfy this definition. We have therefore to regard them as Common Isolates. These isolates will be attached only in the case of a local description or history of the host class. The resulting class should, therefore, come only posterior to the host class. In other words, these are Posteriorising Common Isolates. This finding of the Idea Plane is implemented in the Notational Plane by the fact that the isolate numbers of all such isolates should be preceded by their connecting symbols.

Facets of Anteriorising Common Isolates

Here are the Colon and the Decimal translations of the names of four of the items of "Group 8, Geography", which present Anteriorising Common Isolates.

CC No.	*Item Classified*	*DC No.*
U*m*44, N	Indian journal of geography, 1926	910·5
U*m*56, M	Journal of the Royal Geographical Society, 1830—	910·5
U*m*56, M8	Scottish geographical magazine, 1884—	910·5
U*p*1, M50	Proceedings of the International geographical conference, 1850	910·63

The above table shows that the different periodicals in a host class get individualised in the Colon Classification. Indeed, each periodical is converted into a class, even as a work in literature such as *Hamlet* gets converted into a class. Such a class, formed by

a periodical or by a work in literature, or a sacred work in religion, or a classic in any subject, is called a Quasi Class. This term is introduced to emphasise that such a class is not a class of the universe of knowledge, as Mathematics or Child Psychology is. It is converted into a class only by classifying convention. The class number of a Quasi Class is a Quasi Class Number.

The Decimal Classification has not provided for Quasi Class Numbers, so that all the periodicals mentioned in the above table get one and the same class number. The result is that the Decimal Classification does not mechanise the keeping together of the volumes of a particular periodical, or the maintenance of a preferred sequence among the different periodicals within the same host class. As they all get the same class number, all the volumes of the periodicals in a given host class will be mixed up promiscuously, if we depend for their arrangement on their class numbers alone. This is a negation of classification.

In the Colon Classification, the periodicals in a given host class are grouped by their countries of origin; and those originating from the same country are arranged among themselves by their respective years of commencement. Further, the volumes of one and the same periodical get arranged by their years of publication, as a result of the Colon Book Number being based on the year of publication. This kind of helpful individualisation of the periodicals and other approach materials in a host class is made possible by the Rules of Colon Classification which provide Facets for the Common Isolates. They are all mostly [P] got by the Geographical and Chronological Devices. Take it as a warning that, because you find geographical and chronological numbers in these facets, these facets are not [S] or [T]. Look up the rules of Chapter 2 of the *Colon Classification.*

It would be a help if the Universal Decimal Classification also fitted up similar facets to the Common Isolates. There is nothing in its notational system to prevent this. Indeed, this is one of the author's recommendations to the International Federation for Documentation, which is in charge of the development of that scheme.

CHAPTER 10

Phase Analysis

ANOTHER USEFUL CONCEPT developed by the Colon Classification is that of "Phase analysis". We will find it easy to grasp if it is approached through a number of concrete examples, as was facet analysis.

Bias Phase

Returning to the groups of subjects to be found set out in Chapter 4, consider subject no. 36 in Group 7, Psychology. It is Educational psychology. It involves two main classes, Education and Psychology, and is therefore said to be of two "Phases". Of the two subjects it is Psychology that is the subject of exposition, and that is said therefore to be the "Primary Phase". The subject "Education" is said to be the "Secondary Phase" because it merely indicates the subject towards which the exposition of Psychology is biased. A secondary phase of this kind is called a "Bias Phase". The connecting symbol in the notation of the Colon Classification in such a case is "ob", and in the notation of the Decimal Classification it is "0001", the Colon number for Educational psychology is therefore

SobT,

where S=Psychology,
o=the connecting symbol for phase relation,
b=bias relation
and T=Education.

Similarly the Decimal number ought to be

370·00115,

where 37=Education,
0001=the connecting symbol and phase relation,
and 15=Psychology.

But the complete tables in the *Decimal Classification* give the *ad hoc* number 370·15, thereby adding to the length of the schedule and putting "0" to more than one use, thus necessitating a cautionary note like the following, which occurs in the

introduction to "Table 2. Common subdivisions" on page 1628 of the thirteenth edition.

"These divisions introduced by 0, 00 or 000 may be annext to the number for any subject if 0 or 00 divisions are not already specifically provided under that subject."

Even in cases where "0001" is used as the connecting symbol, it must be remembered that the bias phase cannot be distinguished from other kinds of phase relation in Decimal numbers as the same connecting symbol is prescribed for all cases.

Influencing Phase

Consider next subject 50, occurring in Group 15, Political Science. It is called "Geopolitics". It stands for the study of Political Science as influenced by Geography. It thus involves two different main classes, and its two different constituent subjects form its phases. Political Science is the subject of exposition and is therefore the primary phase. Geography is merely the subject whose influence on the primary phase is studied: it is therefore the secondary phase. In Colon Classification it is called the "Influencing Phase". The digit in the Colon notation for "Influencing Phase relation" is g. The Colon number for Geopolitics is, therefore, WogU.

There does not appear to be a suitable connecting symbol for the influencing phase in the notation of the Decimal Classification. But this concept is not altogether foreign to that scheme as can be seen from the following note which occurs in the complete tables under "150 Psychology". "For interrelations of psychological topics use 0005 divided like 150, e.g. Conception and perception 153·1000527."

153·1 = conception,
0005 is the connecting symbol,
27 is extracted from 152·7 and = perception.

Can we therefore use "0005" as the connecting symbol for the influencing phase?

Other Phases

The Colon Classification has recognised and provided for three other kinds of phases: Comparison, Difference and General

Relation phases. New kinds of books, not yet encountered, may call for the recognition of other kinds of phase relation in the future.

Complex Class

A class which comprehends two or more classes brought into mutual relation can be called a Phased or Complex Class. The constituent classes are called its phases, and their relation is called a phase relation.

The difference between the phase constituent and the facet constituent of a complex class is that the phase constituent can be a subject in its own right, but the facet constituent cannot.

To quote B. I. Palmer (L.A.R. v. 46, 1944, p. 185) "The reason for the growing failure of Dewey to cope with the demands of books and articles at the deeper levels is at once revealed to be due to a confusion of phase, facet and focus." This remark is equally true of the Universal Decimal Classification.

Like facets, phases too are inherent in the subjects themselves. They are not created by a scheme of classification. It is the duty of a scheme of classification to recognise the presence of phases and facets in specific subjects, and to represent them truly in its class numbers. Only then will the arrangement brought about by the class numbers be helpful, and satisfy the various Canons of classification.

CHAPTER II

The "How" of Library Classification

WE BEGAN WITH the statement that class numbers constitute an artificial language of ordinal numbers designed to mechanise the filiatory arrangement of subjects. The determination of helpful sequence does not necessarily require a scheme of classification. As we saw in Chapters 4 and 5, this can be achieved from first principles. But to preserve the sequence arrived at, to keep that sequence consistently adhered to by whoever deals with it and whenever he deals with it, and to restore the preferred sequence among books which have been disturbed without the necessity of reading them every time, for these purposes we do need a scheme of classification. That scheme will prove helpful which recognises the facets and phases in subjects, and provides for them in its class numbers.

Dictionary and Grammar

The schedules of a classification form the dictionary of the classificatory language. If it is to be a true dictionary and not just a phrase-book, the schedule will list not the names of subjects, but only basic concepts (or isolates) that occur as foci in their facets, and out of which the translations of the names of subjects can be built up. And for building them up, rules are necessary. These rules correspond with the grammar of a natural language.

Classificatory translation

Classificatory translation, however, differs from ordinary literary translation in one respect. A classificatory language is invariable, and translation into it is, therefore, a steady one-way process which can have only one conventionally perfect result. In the process of literary translation, on the other hand, a continual subtle interchange takes place between two equally plastic elements, till their differences are resolved in a final adjustment. Since both parties to the intercourse (both languages) are, so to

speak, living personalities, only a living personality can result. And the same partnership may produce other "children", each perfect in its own way as an expression of their union, but bringing out now more, now less of this or that capacity or characteristic of their "parents": the same text then, if it is at all highly organised, may be "perfectly" translated in different ways. Perfection here is not scientific because both terms are almost indefinitely variable.

It is not so in the case of translation into a classificatory language, however. If it were, it would be fatal to the very purpose of classification, which is to preserve a preferred sequence without variation, in as mechanical a manner as possible. A classificatory translation is not only formally pre-determined, but the process is also governed by the fact that one pole is fixed: the whole operation is canalised in the translator's mind by the facets and phases. For the classifier in whom facet- and phase-analysis have become second nature, classification is an almost automatic process: his thought is guided from the start by those postulates of classification pertaining to the idea plane.

Canalisation

A critical examination of the title and contents of the book to be classified is a necessary precaution against ambiguity, vagueness and rhetoric. This examination should follow the route prescribed by the postulates of classification. The classifier must have a keen eye for specific details. His purpose must be to bring out the dominant subject (primary phase) in full, and the adjectival ones (secondary and other phases) in due subordination and in proper sequence so as to expose the author's intention and achievement. To lay bare the subjects of every book in this way would be a tortuous and wasteful task without the aid of the matrix supplied by the postulates of classification. All this preliminary analysis for the enunciation of the specific subject in the form demanded by classificatory language is called "canalisation". Proper translation depends on correct canalisation.

Translation Proper

Once canalisation is completed and the name of the specific subject has been settled by pouring, so to speak, the properly

selected, prepared and amplified words of ordinary language into the mould made with the aid of phase- and facet-analysis, the final step is a simple affair of substituting from the dictionary (schedules) occasionally with the aid of the grammar (rules), equivalent ordinal numbers for the selected words. This last step is translation proper. It is here that the real metempsychosis takes place. The same soul now appears in a new body, the old having been made of the words and the new one being made of ordinal numbers.

From Flair to Science

Apart from the fulfilment of the Canons of classification, a secondary measure of the value of a scheme of classification is the extent to which it provides clear-cut matrices to help the enunciation of the specific subject of a book by correct canalisation. In this, the Colon Classification, which is a late-comer in the field, naturally scores over the Decimal Classification, which was the very first.

Let us use a simile. A classifier may be compared with a person working his way through a forest at night towards the home of a friend (specific subject) who lives somewhere in the heart of the forest. The difficulties, the uncertainties, the disappointments caused by the difficult terrain, treacherous with its hillocks, valleys, unfordable streams and so on, the absence of a guide to the direction in which the friend's house lies, and the multitudinous division of pathways, the signposts which are invisible in the dark, all these will be similar for both the traveller and the classifier. But suppose the friend puts up a powerful lamp on the roof of his house, so that it is visible from the distance: then this will act as a beacon to the traveller, and help him in his trials. Any good scheme of classification gives this sort of help to the classifier who is working his way towards the specific subject of a book. The Decimal Classification gives just that much help.

The traveller will be helped much more, however, if the light put up by the friend is a floodlight, which not only acts as a beacon, but also lights up the region through which he has to walk. Then not merely will the goal be glimmering, but every inch of the path will be lighted. The formula of facets for each main class and canonical class (or alternatively and more generally, the postulates

on facets based on the five fundamental categories) furnished by the Colon Classification, coupled with phase-analysis which is adopted by the scheme quite consciously, serve as just such a floodlight to the classifier.

To quote from *New vistas in classification* by B. I. Palmer, which appeared in the October 1944 issue of The Library Association Record, "For the first time, practical classification can claim to approximate to a science. . . . Normally, while most students could grasp the theory of classification, when it came to the practice they found it demanded an elusive gift called 'flair'. For 'flair', Ranganathan has substituted reasoned analysis: perhaps flair was an intuitive form of the same process? Ranganathan's new book brings the whole problem from the regions of subconscious perception to those of the intellect. This act makes it at once possible to train any intelligent person to classify, instead of merely demonstrating to the classification-aspirant, and then hoping for the best.

"In using such a scheme as Dewey, we are instructed to classify 'first by subject, then by form'. But is it always as simple as this? Too often the subject is lost in a welter of relationships, and the task of deciding to which class a subject belongs can be quite a major task when it rests on flair. And as A's flair is not always B's flair, anomalies creep in which can vitiate the work of the classifier: a work which aims at reducing conflicts to a minimum.

"Now apply the method taught in this new work [*Fundamentals*] and the task becomes susceptible to a methodical approach."

In these few pages have been set out the elements of library classification, and it is hoped that they have not proved altogether incomprehensible. To the author they are fascinating. They seem to have a value beyond the narrow and immediate purpose which makes him pursue them. Classification is a way of thinking. It is a way of thinking systematically and purposefully. It has, therefore, the same general value as any academic subject like the mathematics, linguistics or philosophy to be found in a university course.

CHAPTER 12

EPILOGUE

To My Brother Librarians

THE REASONS for which books are studied ought not to be very different from the reasons for which they are written. Why are books written? Am I asking too much of my brother librarians who are my readers in expecting my reasons to be theirs also? Every writer should face this sort of question, and so should the readers of books. An ambiguous situation arises when books are read for reasons other than those for which they are written; or when the writer, conscious that the reasons for writing books are frequently not the reasons for reading them, allows himself other reasons in order to gain readers.

My writings on subjects other than classification have been described as simple, lucid, gripping and so on. Some have even been described as "thrillers". But as a writer on classification, I have been persistently accused of difficulty. I therefore feel that there is due from me some explanation of the bafflement that my writings on classification have on a large number of librarians. It would be unpleasantly disingenuous of me to publish yet another book on classification without acknowledging a complaint which I know to be common among friends and foes alike. I do not think that the complaint is a legitimate one; but, on the other hand, I am not indifferent to it. No classificationist genuinely moved by the reasons of classification can be indifferent to the accusation that his writings on classification make inaccessible to classifiers the very ideas he is trying to communicate.

Why does a librarian classify at all? He classifies to uncover to himself, in order to make it readily available to readers, everything that a library has on any subject. Comparatively few devote any time at all to practical classification, yet many would agree that the resources uncovered by minute classification are extremely important to know. This raises the question, "Why do so many not practise minute classification?"

Some do not classify minutely because it embarrasses them to try to be as serious as such classification demands. Others disbelieve in the sincerity of classificationists, feeling that they affect a humanly impossible seriousness. Then there is a class of librarians who have a vague goodwill towards classification and classificationists, but who feel that the rewards are small compared with the amount of time and energy necessary, in that minute classification is too much like hard work.

Some librarians have a natural and wholesome disinclination to classify minutely. And these deserve to be respected, as we respect those who, conscious that they lack the proper qualifications of experience or judgment, modestly refrain from advancing opinions on some controversial subject. But there are also some, who from their education and sensibility of mind, might be expected to practise minute classification, and yet do not. The most important single reason why they do not is miseducation as to the reasons for classification. They have acquired the impression either that classification is based upon fancied experience and yields only a fanciful kind of result, or that the full benefits of classification can be obtained in ordinary ways, without minute classification which involves the tedium of reading books through and discovering all their important foci in their accurate sharpness and location.

Because of this background of miseducation from which most librarians seem to come to classification, I utilised the opportunity offered by the University of Bombay to begin an exposition of the subject upon the most elementary plane of understanding, and to proceed to the plane of minute classification (or uncovering) by steps which deflect the reader from false associations and false reasons for classifying. This book is the result. No librarians but those who insist on classifying for the wrong reasons should find minute classification difficult: no librarian who classifies for the right reasons should find it anything but proper.

But what are the right reasons for classifying? If there is so much miseducation, do most librarians who classify broadly do so for the wrong reasons? And, a still more pressing question, is a scheme of classification that does not aim at minuteness, but finds a large number of users, likely to have been designed for the wrong reasons?

Library classification is an uncovering of the thought-content of a book. It is what it should be only when the thought-content as a whole is uncovered, including the primary and secondary phases, the facets of each of the phases, and the foci in each of the facets, by those faculties which apprehend in terms of entirety rather than in terms merely of parts. The classificationist who designs a scheme for the right reasons has felt the need to exercise such faculties. The classifier who applies a scheme for the right reasons is asking the classificationist to accentuate these faculties and to provide him with occasions to exercise them. But corruption of the reasons for classification sets in, in both classifier and classificationist, when the classifier comes to classification with no notion whatever of the faculties required. The history of the design of classifications, and of classifying is to a great extent a history of such corruption.

Not only am I aware of the effect of extreme difficulty that my books on classification and my scheme of classification have had for the majority of readers, but I offer voluntarily the statement that in one sense of difficulty, more difficult schemes would be hard to find. My awareness of exactly how difficult my scheme is gives me, however, the right to say why it is so. It is because it has been designed for all the reasons of classification. If you accuse me of unnecessary difficulty after an honest attempt to classify at least a thousand assorted works in the wave front of knowledge today for the full reasons of classification, you must realise that you will be implying that a classification scheme should be designed only for just a few of the reasons of classification. If you approach my scheme and my books on classification without restricting the reasons of classification within the confines of convention, and after at least a hundred hours of intensive reference service in a busy library, you will not only see that they are not difficult, but you will also discover in yourself reasons for classifying to a degree of minuteness that you have largely neglected in any classificatory work you have done previously. An account of the variety of purposes to be served by classification will be found in the *Prolegomena*, Chapter 37 of ed. 2.

If you desire to view the whole subject of classification from the position taken up by me, you must know readers and know books inside and out. You must not feel shy of either. Take as your

mission the establishment of contact between the right reader and the right book exactly and expeditiously and without any fumbling. You will then see that no scheme of classification can be too minute or too complicated. You will also see that the reader is not concerned with your notation, or with the "how" of your classificatory technique, except in its very superfices. The service of classification can reach him in difficult situations only through you; in other words, classification in its deepest embellishments has to be intelligible only to you, though an intelligent reader may be prepared to share them with you. You will even find that the extent to which a reader in a library contacts the profound manifestations of class numbers will be proportional to his capacity to face them, to understand them and to put them to helpful use. It will also be proportional in the same measure to the depth, the profundity and the subtlety of the thought he seeks to feed upon or the library provides.

If these points are conceded, you will realise what an escapist attitude is that of the librarian who says, "Don't be minute in your classification. Don't divide more minutely than Dewey did about half a century ago. For the public cannot stand it: they will be scared away by it: I too, therefore, dislike it." You will realise too that the length of a class number is determined only by the degree of specialisation of the book classified and, in particular, that most of the books in a general library tend to have only short and simple class numbers.

You will also realise that what should be aimed at is the translation into ordinal numbers of the entire thought-content of the book—all its foci, all its criss-cross of subjects and forms and all its interlacings—fully and literally. Yes, fully and literally!

Francis of Assisi is said to have ascended a mountain to formulate a more precise Rule for his Order. Then he wrote the Rule down and gave it to his vicar, Elias. But Elias either lost the Rule, or secretly destroyed it, finding it too severe. So Francis ascended the mountain again. While he was meditating there, Elias and a group of brethren appeared before him, to protest that they did not want a severe new Rule. Whereupon Francis appealed to his Holy Conscience, which, speaking into the air, affirmed that the Rule must be observed "literally, literally, literally, without gloss, without gloss, without gloss".

025.4 | Rama Rat

And so I say, not within the suppositious context of religion, but within the actual context of library service: literally, literally, literally; fully, fully, fully! So classify, so serve, so exist: for the very best reasons. Any other reasons are not reasons, or no longer reasons. They are mere compulsions from without or mere glosses upon nightmares long ago ridden off the map of experience in the world of knowledge and of libraries, which are the worlds of total integration between books and human beings, as *Granthalaya*, the Sanscrit word for library, means.

Documentation

We now use the term "depth-classification" to denote classification carried to the point of individualising even the tiniest micro-thought.

It has been found necessary in documentation service, which is the name given to reference service with extra emphasis on the exhaustive, expeditious, pin-pointed service of nascent micro-thought such as that embodied in articles in periodicals, to specialist readers engaged in research. Such a documentation service, using such depth-classification has now become a social necessity. This has been brought about by the inadequacy of natural and near-natural commodities to satisfy the needs of the overgrowth of the population of the world. The making of artificial commodities, whether for food, clothing or shelter, has therefore become a continuing and urgent necessity. This demands research-in-series in place of the research-in-parallel of the past. This research-in-series implies the elimination of unintended wasteful repetition of the same investigation, in the world taken as a whole. This elimination calls for division of labour, and the task of the library profession is to make the communication of all nascent micro-thought exhaustive, expeditious and pin-pointed. The fulfilment of this task by the library profession needs documentation, and documentation needs depth-classification.

Now the depth-classification of the ever-turbulent, ever-developing universe of knowledge must be analytico-synthetic in nature. The Universal Decimal Classification made a beginning in this direction at the turn of the present century. Colon

Classification has shown the way to move towards the ideal in this direction. The chief character of this way is the basing of classification on postulates involving facet analysis and fundamental categories.

ANNEXURE I

The Canons of Classification

as delivered in edition 2 of the *Prolegomena*

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1 Canon of Differentiation (131)
2 Canon of Concomitance (132)
3 Canon of Relevance (133)
4 Canon of Ascertainability (134)
5 Canon of Permanence (135)
6 Canon of Relevant Sequence (136)
7 Canon of Consistency (137)

2. Canons for Array

8 Canon of Exhaustiveness (141)
9 Canon of Exclusiveness (142)
10 Canon of Helpful Sequence (143)
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3. Canons for Chain

12 Canon of Decreasing Extension (151)
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14 Canon of Subordinate Classes (161)
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ANNEXURE 2

Principles for Helpful Sequence

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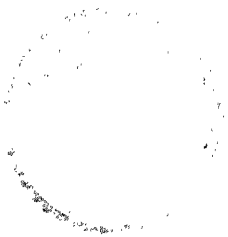
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